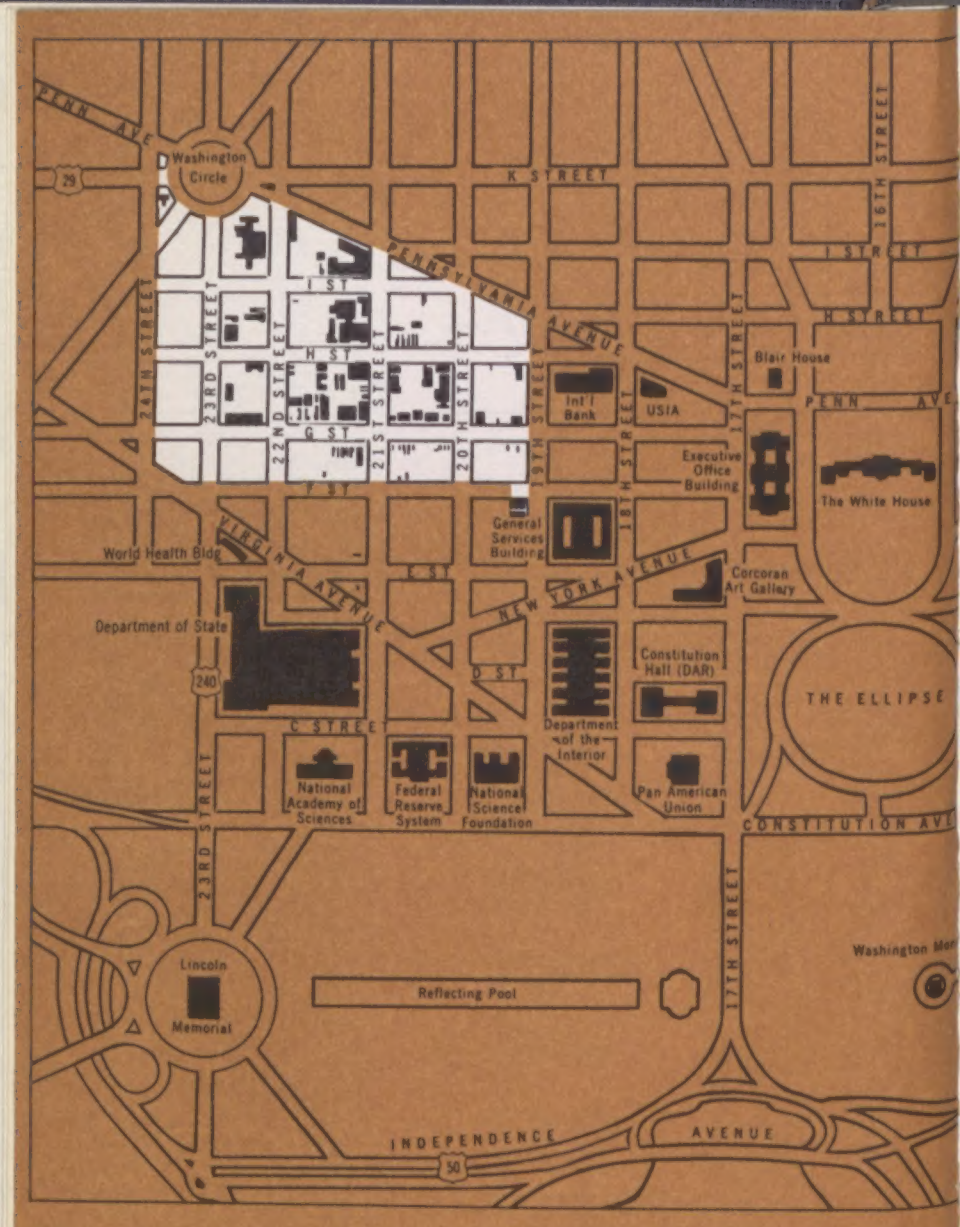
The George Washington University Bulletin



UNDERGRADUATE
AND
GRADUATE
CATALOGUE

1971-1972



THE GEORGE WASHINGTON UNIVERSITY CAMPUS / WASHINGTON, D.C.

THE GEORGE WASHINGTON UNIVERSITY BULLETIN
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THE GEORGE WASHINGTON UNIVERSITY BULLETIN

UNDERGRADUATE AND GRADUATE CATALOGUE 1971–72

Arts and Sciences, Education, Government and Business Administration, Public and International Affairs

This catalogue lists the programs and faculties of Columbian College of Arts and Sciences, the Graduate School of Arts and Sciences, the School of Education, the School of Government and Business Administration, and the School of Public and International Affairs.

It also contains information on the Division of University Students, in which students may register for University courses for credit or as auditors without pursuing degree programs.

For information concerning the University's programs and faculties in Engineering and Applied Science, Law, and Medicine, request the appropriate catalogue.

FACTS ABOUT GEORGE WASHINGTON UNIVERSITY

General Information	Private, nonsectarian, coeducational, founded 1821
Location	Washington, D. C., bounded by Pennsylvania Avenue and 19th, F, and 24th Streets, N.W.
Number of Students	14,998 (9,754 men, 5,244 women)
Number of Undergraduates	5,618 (2,877 men, 2,741 women)
Geographical Origin of Students	50 states, District of Columbia, 91 countries; 20% are from the Washington area
1971–72 Tuition	Undergraduate: $2,050 for two semesters; graduate: $74 for each semester hour (see page 29)
Number of Full-time Faculty	768 (76% with Doctoral degrees)
Number of Part-time Faculty	338 (includes some of the most distinguished men in Washington who serve as professorial lecturers)
Residence Hall Space	1,988 (an additional 2,000 students reside in fraternity houses, rooms, and apartments on or near the campus)
Room and Board	Cost varies from $1,300 to $1,425 for the academic year (see page 57)
Campus Organizations	145

Undergraduate majors: Accounting, American Civilization, American Literature, Anthropology, Applied Mathematics, Applied Statistics, Art History and Theory, Biology, Botany, Business Administration, Chemistry, Chinese Studies, Civil Engineering, Classical Archeology and Greek, Classical Humanities, Dramatic Art, Economics, Electrical Engineering, Elementary Education, English Literature, Fine Arts, French Language and Literature, Geography, Geology, Germanic Languages and Literatures, History, International Affairs, International Business, Journalism, Latin, Latin American Studies, Mathematical Statistics, Mathematics, Mechanical Engineering, Medical Technology, Music (Applied, History and Literature, Theory), Philosophy, Physical Education, Physics, Political Science, Premedicine, Psychology, Public Affairs, Religion, Russian Language and Literature, Secondary Education, Sociology, Spanish American Literature, Spanish Language and Literature, Speech Communication, Speech Pathology and Audiology, Zoology.

Study leading to graduate or professional degrees is offered in the Graduate School of Arts and Sciences, the National Law Center, the School of Medicine, the School of Engineering and Applied Science, the School of Education, the School of Government and Business Administration, and the School of Public and International Affairs.

UNIVERSITIES are undergoing change, either drastically or slowly, as they have been for centuries. Whatever the changes, the one premise on which universities are based remains constant: universities are for learning—for acquiring learning, for transmitting learning, and for the exploration that yields new learning. Any other objective is unworthy of a university, and any other purpose is incompatible with the student and his relationship to the institution.

The faculty, through scholarship and research, extends learning, and it transmits learning by teaching. The student learns from the faculty, the library, and the laboratory—if he accepts, as he must accept, learning as his objective. This learning does not take place in a vacuum; in addition to the particular content of learning, the student will develop certain habits of mind—analytical thinking, powers of insight, self-examination, and the use of rational discourse—that will serve him throughout his personal and professional life.

Within this basic context, George Washington University invites the student to take up his residence in order that his energies, interests, and talents may be directed to learning.

Exceptional opportunities for learning are made possible because of the University's location in the heart of the Nation's Capital. For example, cooperative programs are conducted in various fields of study with members of Congress, the Smithsonian Institution, the Library of Congress, the National Gallery of Art, and other Federal and private organizations. In addition to these programs, Washington presents opportunities for observation, study, service, and recreation limited only by the student's time, energy, and imagination.

In this atmosphere, George Washington University seeks to provide a matrix for learning not available in the standard university education, so that no graduate can ever forget that as a student he was at the center of things and that he must forever carry additional responsibility in and for society, because of the opportunity that was his.

LLOYD H. ELLIOTT
President
The George Washington University



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THE UNIVERSITY CALENDAR 1971–72*



1971

SEPTEMBER

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
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26	27	28	29	30		

OCTOBER

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31						

NOVEMBER

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1972

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MARCH

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MAY

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JULY

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23	24	25	26	27	28	29
30	31					

AUGUST

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20	21	22	23	24	25	26
27	28	29	30	31		

1971 FALL SEMESTER

September 3 Orientation for students from foreign countries *Friday*

September 7 Placement tests and advising for entering freshmen who did not attend Summer Advance Registration sessions *Tuesday*

September 7–8 Advising *Tuesday–Wednesday*

September 8 Placement tests and advising for transfer students *Wednesday*

September 8 University Faculty Assembly Meeting *Wednesday*

†*September 9–11* Registration *Thursday–Saturday*
Application for February graduation due as part of registration

September 11–12 Activities for new students *Saturday–Sunday*

September 13 Classes begin *Monday*

September 20–21 No classes *Monday–Tuesday*

October 1 Application for October Ed.D. Comprehensive Examinations due *Friday*

* This calendar is subject to change.
† Registration is conducted alphabetically according to the first letter of the student's surname. The alphabetical breakdown and the hours of registration will be stated in the *Schedule of Classes*, which is available well in advance of each semester.

October 15	Columbian College of Arts and Sciences Faculty Meeting *Friday*
October 20	Application for School of Public and International Affairs November Master's Comprehensive Examinations due *Wednesday*
October 21	Board of Trustees Meeting *Thursday*
October 30	Ed.D. Comprehensive Examinations *Saturday*
November 5	Application for December Ed.D., Ed.S., and M.A. in Ed. Comprehensive Examinations due *Friday*
November 13	National Teacher Examinations *Saturday*
November 19–20	School of Public and International Affairs Master's Comprehensive Examinations *Friday–Saturday*
November 24	Thanksgiving recess begins after last class *Wednesday*
November 29	Classes resume *Monday*
December 3–4	School of Government and Business Administration Master's Comprehensive Examinations *Friday–Saturday*
December 4	Ed.D., Ed.S., and M.A. in Ed. Comprehensive Examinations *Saturday*
December 6	D.B.A., D.P.A., and Ph.D. Dissertations of February candidates due *Monday*
December 10	Last day of fall-semester classes *Friday*
December 13–22	Examination period *Monday–Wednesday*
January 3	Master's Theses of February candidates due *Monday*
January 5	Columbian College of Arts and Sciences Faculty Meeting *Wednesday*
January 10	Ed.D. Dissertations of February candidates due *Monday*
1972	**SPRING SEMESTER**
January 17	Placements tests *Monday*
January 17–19	Advising for freshmen, sophomores, and all new students *Monday–Wednesday*
January 20	Board of Trustees Meeting *Thursday*
**January 20–22*	Registration *Thursday–Saturday*
	Application for May graduation due as part of registration
January 24	Spring-semester classes begin *Monday*
February 1	University Faculty Assembly Meeting *Tuesday*
February 21	Winter Convocation (holiday) *Monday*
March 3	Columbian College of Arts and Sciences Faculty Meeting *Friday*
March 15	Application for School of Public and International Affairs April Master's Comprehensive Examinations due *Wednesday*
March 16	Board of Trustees Meeting *Thursday*
March 24	Application for April Ed.D., Ed.S., and M.A. in Ed. Comprehensive Examinations due *Friday*
March 25	Spring recess begins after last class *Saturday*

* Registration is conducted alphabetically according to the first letter of the student's surname. The alphabetical breakdown and the hours of registration will be stated in the *Schedule of Classes*, which is available well in advance of each semester.

April 3	Classes resume *Monday*
April 4	D.B.A., D.P.A., and Ph.D. Dissertations of May candidates due *Tuesday*
April 8	National Teacher Examinations *Saturday*
April 10	Ed.D. Dissertations of May candidates due *Monday*
April 14–15	School of Government and Business Administration and School of Public and International Affairs Master's Comprehensive Examinations *Friday–Saturday*
April 22	Ed.D., Ed.S., and M.A. in Ed. Comprehensive Examinations *Saturday*
April 24	Master's Theses of May candidates in the School of Public and International Affairs due *Monday*
April 28	Last day of spring-semester classes *Friday*
May 1	Master's Theses of May candidates (other than those in the School of Public and International Affairs) due *Monday*
May 4–13	Examination period *Thursday–Saturday*
May 10	Columbian College of Arts and Sciences Faculty Meeting *Wednesday*
May 18	Board of Trustees Annual Meeting *Thursday*
May 28	Commencement *Sunday*

1972 SUMMER SESSIONS

June 12	Registration for first 5-week session and first 3-week Education workshop *Monday*
June 13	First 5-week session and first 3-week Education workshop classes begin *Tuesday*
June 30	First 3-week Education workshop ends *Friday*
July 3	Registration and beginning of classes for second 3-week Education workshop and 6-week Education session *Monday*
July 4	Holiday *Tuesday*
July 19	First 5-week session ends *Wednesday*
July 20	Registration for second 5-week session *Thursday*
July 21	Second 5-week session classes begin *Friday*
July 21	Second 3-week Education workshop ends *Friday*
July 24	Registration and beginning of classes for third 3-week Education workshop *Monday*
August 11	Third 3-week Education workshop and 6-week Education session ends *Friday*
August 25	Second 5-week session ends *Friday*

THE UNIVERSITY

HISTORY

THE GEORGE WASHINGTON UNIVERSITY had its beginning in 1821 as The Columbian College in the District of Columbia. The name of the institution was changed in 1873 to Columbian University and in 1904 to The George Washington University. The debt of the University to George Washington, whose name it bears, is an intangible one.

George Washington, as President and as private citizen, had urgently insisted upon the establishment of a National University in the Federal City. There he hoped that, while being instructed in the arts and sciences, students from all parts of the country would acquire the habits of good citizenship, throwing off local prejudices and gaining at first hand a knowledge of the practice, as well as the theory, of republican government. To further the materialization of his hopes, Washington left a bequest of fifty shares of The Potomac Company, "towards the endowment of a University to be established within the limits of the District of Columbia, under the auspices of the General Government, if that government should incline to extend a fostering hand towards it." The Congress never extended "a fostering hand." The Potomac Company passed out of existence, and Washington's bequest became worthless.

Fully conscious of Washington's hopes, but motivated primarily by a great missionary urge and the need for a learned clergy, a group of dedicated ministers and laymen sponsored a movement for the establishment of a college in the District of Columbia. Inspired largely by the zeal and energy of the Reverend Luther Rice, they raised funds for the purchase of a site and petitioned Congress for a charter. After much delay and amendment, Congress granted a charter which was approved by President Monroe on February 9, 1821. To safeguard the College's nonsectarian character it provided "That persons of every religious denomination shall be capable of being elected Trustees; nor shall any person, either as President, Professor, Tutor or pupil, be refused admittance into said College, or denied any of the privileges, immunities, or advantages thereof, for or on account of his sentiments in matters of religion."

During the entire time when the institution was known as Columbian College, its activities were centered on College Hill, a tract of forty-six and a half acres between the present Fourteenth and Fifteenth Streets extending north from Florida Avenue to somewhat beyond Columbia Road. The Medical School was located downtown. For the better part of the Columbian Univer-

sity period, the buildings of the University were situated along H Street between Thirteenth and Fifteenth Streets. The Medical School group still remains there.

During the last half century the University's present plant has been developed in that section of the old First Ward familiarly known as "Foggy Bottom," between Nineteenth and Twenty-fourth Streets, south of Pennsylvania Avenue. The area is not without its reminders of historic interest to the University. President Monroe, who signed the Charter, lived at 2017 Eye Street. The first President of the Board of Trustees, the Reverend Obadiah B. Brown, was for fifty years the pastor of a church at Nineteenth and Eye Streets, and Washington selected Twenty-third and E Streets as the site of the National University he hoped to see established.

PURPOSE AND OBJECTIVES

The purpose of The George Washington University was to realize "the aspirations of Washington, Jefferson, and Madison, for the erection of a university at the seat of the Federal Government." Over the years it has been the aim to develop the University ideal in the Nation's Capital with a view toward meeting the changing needs of society while continuing to pursue the traditional principles of learning and research.

The George Washington University now rededicates itself and all the resources at its command to the pursuit of knowledge and its dissemination. To this end:

The University recognizes its special opportunities in and obligations to one of the principal capitals of the world. It is a primary objective of the University to utilize its historical, geographical, and functional relationship to the Nation's Capital and the Washington community in continuing the development of a great nationally and internationally oriented university.

The University recognizes the needs of our times and accepts the challenge to develop each student's potential abilities to the fullest extent.

The University is and should remain privately controlled, nonsectarian, and co-educational.

Admission to the University is determined only in terms of the personal character and academic qualifications of the candidates.

A broadly based liberal education is fundamental to the total program of the University.

Expansion of graduate and professional studies and research and the utilization for this purpose of the excellent research facilities and materials available in the Nation's Capital are basic to the continuous development of the University's educational program.

The provision of superior instruction and facilities and the application of high standards of entrance qualifications and academic achievement to all students whether full-time or part-time, on-campus or off-campus, are major missions of the University.

A balanced program of student extracurricular activities is an integral part of the University program.

The University will continue to strive to meet the evident needs of an enlarged student body while governing the size of enrollment by its capacity to supply adequate staff and facilities for the excellent teaching and research which it espouses.

THE COLLEGES, SCHOOLS, AND DIVISIONS

George Washington University includes eleven colleges, schools, and divisions, as follows:

*Columbian College of Arts and Sciences.** through its lower and upper divisions, offers four-year programs in the arts and sciences leading to the degrees of Bachelor of Arts, Bachelor of Science, and (in cooperation with the Department of Pathology and the University Hospital) Bachelor of Science in Medical Technology. The lower division also provides the first two years of the prelegal and premedical programs; the preprofessional work required for admission to the School of Education, the School of Government and Business Administration, and the School of Public and International Affairs. Columbian College has academic jurisdiction over the off-campus programs leading to the degrees of Bachelor of General Studies, Bachelor of Science in Environmental Health, Bachelor of Science in Geodetic and Cartographic Science, and Bachelor of Science in Oceanography. These off-campus programs are administered by the College of General Studies.

The Graduate School of Arts and Sciences† offers advanced study and research leading to the degrees of Master of Arts, Master of Fine Arts, Master of Music, Master of Science, Master of Science in Forensic Science, Master of Science for Teachers, and Doctor of Philosophy.

*The School of Medicine**† offers work leading to the degree of Doctor of Medicine.

The National Law Center offers courses leading to the degrees of Juris Doctor, Master of Laws, Master of Comparative Law, Master of Comparative Law (American Practice), and Doctor of Juridical Science; and special programs in Continuing Legal Education.

The School of Engineering and Applied Science offers courses leading to the degree of Bachelor of Science in the following areas: Civil Engineering, Electrical Engineering, and Mechanical Engineering. Graduate programs lead to the degrees of Master of Science, Master of Engineering Administration, and Doctor of Science.

The School of Education offers undergraduate programs leading to the degrees of Bachelor of Arts in Education and Bachelor of Science in Physical Education; graduate studies leading to the degrees of Master of Arts in Education, Master of Arts in Teaching, Education Specialist, and Doctor of Education.

The School of Government and Business Administration offers undergraduate programs leading to the degree of Bachelor of Business Administration and graduate programs leading to the degrees of Master of Arts in Government, Master of Arts in Health Care Administration, Master of Business Administration, Master of Public Administration, Master of Urban and Regional Planning; the Post-Master's Graduate Certificate in Health Care Administration; the degrees of Doctor of Business Administration and Doctor of Public Administration. The School also has academic jurisdiction over off-campus programs leading to the following degrees: Bachelor of Science in Administration

* Columbian College of Arts and Sciences cooperates with the School of Medicine in offering a program leading to the combined degrees of Bachelor of Arts and Doctor of Medicine.

† The Graduate School of Arts and Sciences cooperates with the School of Medicine in offering a program leading to the combined degrees of Master of Science and Doctor of Medicine and a dual program leading to the degrees of Doctor of Medicine and Doctor of Philosophy.

and Master of Science in Administration. These off-campus programs are administered by the College of General Studies.

The School of Public and International Affairs offers undergraduate programs leading to the degree of Bachelor of Arts and graduate programs leading to the degree of Master of Arts. The School also offers an off-campus program leading to the degree of Master of Science in International Affairs.

The College of General Studies supplements the adult education program of the University through campus and off-campus study; conferences, seminars and special projects; and continuing education and noncredit programs. This College also administers the off-campus programs over which Columbian College of Arts and Sciences, the School of Engineering and Applied Science, and the School of Government and Business Administration have academic jurisdiction.

The Division of University Students makes available courses for students not candidates for degrees in this University.

The Summer Sessions.

ACADEMIC STATUS

George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Secondary Schools.

The University is on the approved list of the American Association of University Women and is a member of the College Entrance Examination Board.

The National Law Center is a charter member of the Association of American Law Schools and is approved by the Section of Legal Education and Admissions to the Bar of the American Bar Association. The School of Medicine is a member of the Association of American Medical Colleges and is one of the medical colleges which have been continuously approved by the American Medical Association. Curricula of the School of Engineering and Applied Science in Civil, Electrical, and Mechanical Engineering are accredited by the Engineers' Council for Professional Development. The School of Education is a charter member of the American Association of Colleges for Teacher Education and is accredited by the National Council for Accreditation of Teacher Education for its Bachelor's and Master's degree programs. The School of Government and Business Administration has maintained full membership in the Middle Atlantic Association of Colleges of Business Administration since 1961. It joined the Council on Graduate Education for Public Administration in 1966. By invitation, in 1968, the School became a charter academic member of the American Association of Collegiate Schools of Business Assembly. The programs in Public Accounting designed to prepare students for Certified Public Accountants examinations have been approved by the state boards of New York and of Maryland. The program in Hospital Administration is accredited by the National Accrediting Commission on Graduate Education for Hospital Administration. The Department of Chemistry is on the approved list of the American Chemical Society.

LOCATION

The University is in downtown Washington, between Pennsylvania Avenue and 19th, F, and 24th Streets, N.W. In immediately adjacent areas are the White House, the World Bank, the United States Information Agency, the Corcoran Gallery of Art, the Department of State, the Department of the Interior, the

General Services Administration, the National Academy of Sciences, and the Kennedy Center for the Performing Arts.

GOVERNMENT

The University is privately endowed and is governed by a self-perpetuating Board of Trustees of which the President of the University is an ex officio member. The members of the Board are named for a period of three years and are divided into three classes. The members of one class are elected at each annual meeting to fill the places of the members whose terms of office expire. Two members of each class are nominated by the Alumni Association.

THE UNIVERSITY LIBRARIES

The Library collections of the University are housed in the University Library, the general library of the University, and in the departmental libraries of law and medicine.

These collections contain over 517,000 volumes—about 367,000 in the University Library, about 107,000 in the Law Library, and about 43,000 in the Medical Library. Approximately 30,000 volumes a year are added to the Library's resources. Endowments, supplementing the University appropriation, provide books in the fields of American civilization, American literature, foreign service, history, public finance, and the social sciences; and gifts from many sources have enriched the collections. The Libraries currently receive about 4,500 periodicals.

Information concerning the use of the Libraries may be obtained at the Library service desks.

The Library is administered for the curricular, reference, and recreational needs and interests of the students. Instruction in the use of the library is given upon request by the reference librarians. The Library endeavors to assist students and all members of the University to use the rich library resources of Washington and the unusual opportunities they offer for extensive research. Interlibrary loan arrangements are maintained with other libraries in the city and in the United States.

The student has access to the Library of Congress, the Public Library of the District of Columbia and its branches, the libraries of the Pan American Union, the Bureau of Railway Economics, the U.S. Department of Agriculture, the Smithsonian Institution, the National Library of Medicine, and many of the other great special collections of the government departments. Full-time graduate students at George Washington University may, upon application to the Office of the Director of Libraries, be issued a Consortium library card which permits direct borrowing from the libraries of the other Consortium institutions.

Except during the summer, intersession, and vacation periods, the hours of the University Library are Monday through Friday, 8:30 a.m. to 12:00 midnight; Saturday, 9:00 a.m. to 10:00 p.m.; Sunday, 1:00 p.m. to 12:00 midnight. The Law Library is open Monday through Friday, 8:00 a.m. to 12:00 midnight; Saturday, 9:00 a.m. to 5:00 p.m.; and Sunday, 12:00 noon to 12:00 midnight. The Medical Library is open Monday through Friday, 7:30 a.m. to 10:00 p.m.; Saturday, 8:30 a.m. to 5:00 p.m.; Sunday, 12:00 noon to 5:00 p.m.

THE BOARD OF TRUSTEES OF THE UNIVERSITY

The President of the University is an ex officio member of the Board of Trustees.

Edward Karrick Morris, LL.D., *Chairman*
Charles Emory Phillips, LL.B., LL.M., *Vice Chairman*
James Matlack Mitchell, M.A., *Secretary*
John W. Thompson, Jr., B.A., *Assistant Secretary*

TERM ENDING 1971

*Harold Keith Bradford, B.A., LL.B.
Jacob Burns, LL.B., LL.D.
Eugene Cassin Carusi, M.A., J.D.
Miss Jacqueline Cochran, L.H.D., LL.D., Sc.D.
Harry F. Duncan
Mrs. Katharine Graham, B.A.
Lewellyn A. Jennings
Thornton W. Owen, B.S. in C.E., B.A.
Carleton D. Smith
Douglas Rathbone Smith, B.S.C.
Mark Sullivan, Jr., B.A.
*William Gregg White, B.S. in C.E.
John Johnston Wilson, LL.B.
Stephen Russell Woodzell, B.S. in E.E.

TERM ENDING 1972

Mortimer Maxwell Caplin, B.S., LL.B., J.S.D., LL.D.
Leonard Carmichael, Ph.D., Sc.D., LL.D., Litt.D., L.H.D., D.C.L.
Henry Christian Clausen, J.D.
*Harry Filmore Dowling, B.A., M.D., Sc.D.
John Bonner Duncan, B.A., LL.B., LL.D.
Melville Bell Grosvenor, B.S., Sc.D., LL.D.
Joseph H. Hirshhorn
*Thaddeus A. Lindner, B.A. in Govt.
Jeremiah Milbank, Jr., B.A., M.B.A.
James Matlack Mitchell, M.A.
Sidney Dillon Ripley II, Ph.D., L.H.D., ScD.
Orville Findley Rush, J.D., LL.D.
Charles E. Smith
James Otis Wright, B.S., J.D.

TERM ENDING 1973

Robert Calhoun Baker, LL.D.
*Everett Hollis Bellows, B.A., M.A.
George A. Butler, LL.B.
Donald C. Cook, B.A., M.B.A., J.D., LL.M., L.H.D., LL.D.

---

* Nominated by the alumni.

Richard Arnold Harrison, B.A., M.A.
Brooks Hays, B.A., J.D., LL.D., L.H.D., D.C.L., D.D., HH.D.
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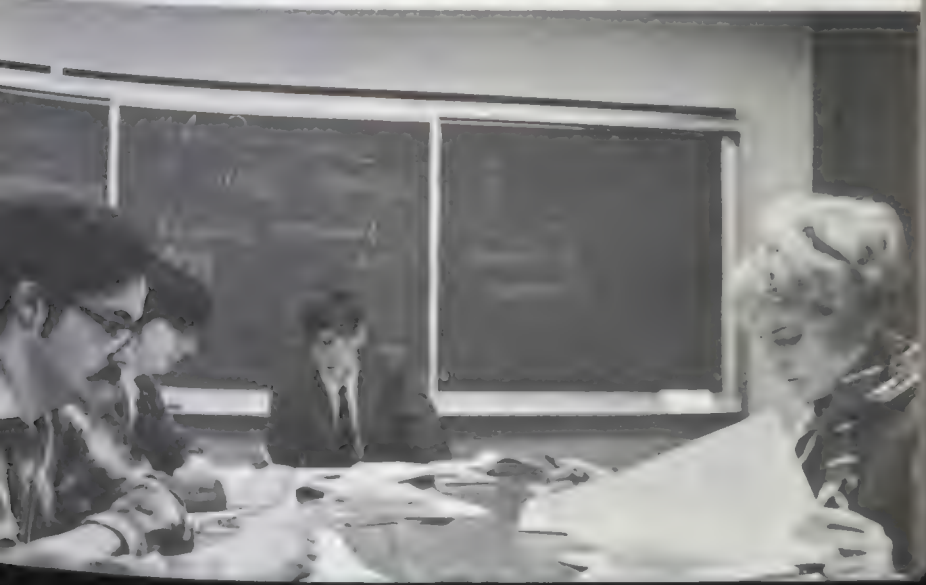
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Robert Poindexter Sharkey
*Rodney Tillman
George Vartkes Vahouny
Reuben Esselstyn Wood

*Ex officio member.





GENERAL INFORMATION

Admission

IE UNIVERSITY ACCEPTS BOTH MEN AND WOMEN. Students are admitted at the ginning of each semester and summer session.

The right is reserved to refuse admission to any student with an academic cord which creates doubt of his ability to succeed in college or who, for any her reason, would not be an acceptable student.

An application for admission to degree candidacy should be accompanied by $25 application fee.* The application fee is waived for a student applying r readmission who was registered as a degree candidate at the time of his last gistration at this University and has not since registered at another institution.

Applicants are urged to submit the application form and complete creden- ls well in advance of the semester for which they seek admission.

All credentials submitted in support of an application are treated confiden- lly and the contents are disclosed only to authorized individuals. Such cre- ntials become the property of the University and cannot be returned.

UNDERGRADUATE ADMISSION†

rms for application for admission or readmission are available at and should returned to the Office of Admissions, George Washington University, Wash- ton, D.C. 20006.

CONDARY SCHOOL STUDENTS

Regular Admission.—Applicants for regular admission who wish to begin lege in the fall semester or in either the first or second term of the summer sion *should* apply during the fall term of the senior year in high school. ference will be given to students who submit applications and required cre- tials prior to March 1. Students graduating at mid-year who wish to begin lege in the spring semester *must* apply no later than December 1.

An applicant from a secondary school must arrange to have sent directly m his school to the Office of Admissions a complete academic record to-

*plication fee must be by check or postal money order, payable to George Washington Univer-

r detailed admission requirements, see the appropriate college or school in this Catalogue.
required for admission and Educational Testing Service information are described on page
See pages 26–27 for admission requirements for students from foreign institutions.

gether with a personal evaluation and recommendation from his principal. T information may be supplied on a form provided by the University or o standard form used by the secondary school, provided all essential informat is included.

Early Decision Plan.—For the qualified student who wants to begin coll in the fall semester and receive an early notice of acceptance, the Univers offers an early decision plan. The student need *only* indicate on the applicat form that he wishes an early decision and have all required credentials in Office of Admissions prior to November 1. A decision will be mailed by cember 15. The declaration of intent to attend the University and a $200 tion deposit (plus an additional $200 housing deposit for resident student nonrefundable *must be submitted by January 15 to reserve space.*

If the applicant is accepted under the early decision plan but fails to sub the deposit by January 15, he will be reconsidered, along with all other ap cants, for regular admission, as described above.

Early Admission Plan.—Unusually well-prepared students who have co pleted the junior year in high school may be considered for admission if th submit special credentials and have the unqualified recommendation of th principal or counselor. Inquiries should specifically mention the Early Adm sion Plan.

TRANSFER STUDENTS

Undergraduate transfer students from other institutions *must* submit appli tion and required credentials prior to June 1 for the fall semester, Decemb 1 for the spring semester, May 1 for the first summer session, and June 1 the second summer session.

The transfer student must be in good standing as to scholarship and condu He must be eligible to return to the last previously attended institution in t semester for which he seeks admission to this University.

An applicant who has attended one or more institutions of higher learni must request *each* registrar to mail directly *to the Office of Admissions* a tra script of his record, *even though credits were not earned.*

If high school units are not shown on the college transcript, the applica should request his high school to submit a transcript to the Office of Admissions

If an applicant has fewer than 30 semester hours of acceptable work (C better on academic work from an accredited institution at the time the app cation is submitted), he must request that his high school record and Colle Entrance Examination Board test scores be sent to the Office of Admissions.

TUITION DEPOSIT

Upon notification of acceptance, a $100 tuition deposit ($200 for students mitted by "Early Decision Plan," see above) will be required of all full-ti undergraduate students including those readmitted. The deposit is credit toward tuition and is not refundable.

ADVANCED STANDING

CREDIT FOR ADVANCED PLACEMENT EXAMINATIONS

Up to 30 semester hours of credit may be granted for college-level courses an approved secondary school, if substantiated by satisfactory performance

the appropriate Advanced Placement Examination of the College Entrance Examination Board. Arrangement for the examination is the responsibility of the applicant and should be made with the College Board Advanced Placement Examinations, Box 977, Princeton, N.J. 08540.

Credit is assigned for examinations with scores of 4 or 5 on the basis of a score report from the Educational Testing Service. This report must be requested by the student. Examinations with grades of 3 will be given consideration for possible placement and/or credit if the student arranges to have the examination paper sent to the Office of Admissions at this University.

CREDIT FROM HIGHER INSTITUTIONS

Advanced standing may be granted for work successfully completed at accredited institutions of higher learning. Credit will be granted for transferred work only when it meets the requirements for the degree sought at this University. It may be allowed provisionally. Work of low pass grade (*D* or the equivalent) will not be considered for transfer.

SERVICE SCHOOL CREDIT

A limited amount of credit earned in service schools since 1941 may be considered for assignment to qualified degree candidates. Veterans should submit to the Office of Admissions photostatic copies of their service school records, indicating courses successfully completed with sufficient identification of the course to locate it in the *Guide to Evaluation of Educational Experience in the Armed Forces.*

GRADUATE ADMISSION*

Graduate School of Arts and Sciences.—Forms for application for admission or readmission are available at the Office of the Dean of the Graduate School of Arts and Sciences, George Washington University, Washington, D.C. 20006. When completed, these application forms should be submitted to this Office, together with college transcripts and letters of reference, no later than February 15 for the fall semester and November 1 for the spring semester.

School of Education.—Forms for application for admission or readmission are available at the Office of the Dean of the School of Education, George Washington University, Washington, D.C. 20006. When completed, these application forms should be submitted to this Office no later than June 1 for the fall semester, November 1 for the spring semester, April 1 for the summer sessions.

School of Government and Business Administration.—Forms for application for admission or readmission are available at the office of the Admissions Officer, School of Government and Business Administration, George Washington University, Washington, D.C. 20006. When completed, these application forms should be submitted to this Office no later than July 1 for the fall semester, December 1 for the spring semester, May 1 for the first summer session, and June 1 for the second summer session.

* For detailed admission requirements, see the appropriate college or school in this Catalogue. See pages 26–27 for admission requirements for students from foreign institutions.

School of Public and International Affairs.—Forms for application for mission or readmission are available at the Graduate Admissions Office, Sch of Public and International Affairs, George Washington University, Washingt D.C. 20006. When completed, these application forms should be submit to this Office no later than March 1 (February 1 for applicants for gradu assistantships and foreign applicants). Admission is for the fall semester on All credentials, including transcripts from all institutions attended, Gradu Record Examination scores, and letters of reference, must be received bef the deadline date.

DIVISION OF UNIVERSITY STUDENTS ADMISSION*

Forms for application for admission to *nondegree* status in the Division University Students are available at and should be returned to the Office Admissions, George Washington University, Washington, D.C. 20006. Wh completed, these application forms, with credentials when required, should received by the Office of Admissions no later than the Friday before the fi day of registration (see Calendar, pages 7–9). No application fee is charg for admission to this Division. For detailed entrance requirements, see pa 170–71.

Registration in a given course may be denied students in this Division wh space is needed for degree candidates.

READMISSION

A student previously registered in the University who was not registered campus during the immediately preceding semester (summer session excluded must apply for readmission. Final dates for applying are the same as those f "Undergraduate Admission" (see pages 23–25), or "Graduate Admission" (s pages 25–26). If the student applies as a degree candidate and was previous registered as a nondegree student, or if he has attended one or more high institutions during his absence from the University, he must have compl official transcripts sent to the appropriate office at this University from ea institution attended. Applications for readmission are considered on the ba of regulations currently effective.

The application fee is waived for a student applying for readmission w was registered as a degree candidate at the time of his last registration at t University and has not since registered at another institution.

STUDENTS FROM FOREIGN INSTITUTIONS†

Application, required records, and scores on the *Test of English as a Forei Language* (see page 27) must be received from *foreign applicants* no later th March 1 (February 1 for applicants for graduate study in the School of Publi and International Affairs) for the fall semester and November 1 for the spri semester.

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* See this page for admissions requirements for students from foreign institutions.
† For detailed admission requirements, see the appropriate college or school in this Catalog
Tests required for admission and Educational Testing Service information are described on pa 70 and 170.

EQUIRED RECORDS

pplicants must request all educational institutions attended to send *directly* to e appropriate office (see "Undergraduate Admission," pages 23–25, or "Grad- ate Admission," pages 25–26) official credentials listing subjects studied, grades ceived, examinations taken, and degrees received. Certified copies of di- omas and certificates from secondary schools and all colleges and universities tended are required. Records of state examinations and certificates are also eded. All records become the property of the University and *cannot* be re- rned.

ANGUAGE TEST

udents whose native tongue is not English are required to take the *Test of nglish as a Foreign Language*. Students are responsible for making arrange- ents for taking the test and should address inquiries to: TOEFL, Educational esting Service, Princeton, New Jersey 08540, U.S.A. The completed applica- on form should be returned to the Testing Service at Princeton well in ad- nce of the beginning of the semester for which the applicant seeks admission. he test fee, which should be remitted with the application, entitles the student have his test score sent to three different institutions. Registration for the *st of English as a Foreign Language* does *not* constitute application for ad- ission to George Washington University.

The Bulletin of Information, obtainable without charge, contains a descrip- on of the test as well as rules regarding application, fees, reports, and the onduct of the test; lists of examination centers; examination dates; and an pplication blank. On the application for the test, the student should specify at the scores be sent to the appropriate office at this University (see "Under- raduate Admission," pages 23–25, or "Graduate Admission," pages 25–26). If additional tests are prescribed, necessary instructions will be sent to the pplicant.

TRANSFER WITHIN THE UNIVERSITY

r information concerning transfer from one college, school, or division to nother within the University, see page 47.

Registration

E DATES, HOURS, AND PLACE OF REGISTRATION will be stated in the *Schedule Classes*, which is available well in advance of each semester.

A student cannot register for classes until he has received a letter of admis- on to the University issued by the appropriate admitting office.

No registration is accepted for less than a semester or one summer session.

A student may not register concurrently in this University and another insti- tion without the prior permission of the dean of the college, school, or divi- on in which he is registered in this University. Registration in more than one llege, school, or division of the University requires the written permission of

the deans concerned, *prior to registration*. Allowance of credit for work d concurrently at another institution is at the discretion of the appropriate c mittee.

ELIGIBILITY FOR REGISTRATION

Registration for the following categories of campus students is held on the d of registration stated in the University Calendar. No student who is suspen or whose record is not clear for any reason is eligible to register. Registra in a given course may be denied students in the Division of University Stud when space is needed for degree candidates.

New Student.—Upon receipt of a letter of admission, the new studen eligible for registration on the stated days of registration.

Readmitted Student.—A student previously registered in the University was not registered for campus courses during the preceding semester or s mer session must apply for and receive a letter of readmission from the ap priate admitting office before he is eligible for registration. A student regist for the spring semester of 1971 need not apply for readmission for the semester of 1971. Such a student is a "Continuing Student."

Continuing Student.—The student registered for campus courses in the mediately preceding semester of the academic year is eligible to register u presentation of his student identification card from the previous semetser. student registered for the 1971 Summer Sessions campus courses, and not stricted to summer registration, is eligible to register for the 1971 fall mester on presentation of his 1971 Summer Sessions student identification car

REGISTRATION CHANGES AND WITHDRAWALS (see pages 32–33, 46)

REGISTRATION FOR CONSORTIUM COURSES

Students interested in taking courses at any of the four other universities in Consortium of Universities of the Washington Metropolitan Area, Inc. page 52), should consult the program announcements of the other univ ties. Consortium application forms and instructions are available from Registrar after the student has obtained his registration packet. In orde participate in the Consortium program (1) the graduate student must ob the approval of his adviser and should ascertain from the department of university where the course is taught whether or not he is eligible for course and whether there is a space in the class *or* (2) the undergraduate dent must obtain the approval of his adviser and *must* ascertain from the partment of the university where the course is taught whether or not h eligible for the course and whether there is space in the class. Specific quiries should be addressed to the Registrar.

Fees and Financial Regulations

FEES PAID BY STUDENTS cover only a portion of the cost of the operation the University. Income from endowment funds, grants, and gifts from alu and friends of the institution make up the difference.

The following fees and financial regulations were adopted for the academic ar 1971–72. (See page 31 for projected tuition increases for 1972–75.)

ition Fees

r undergraduate study in Columbian College of Arts and Sciences, the School of ucation, the School of Government and Business Administration, the School of blic and International Affairs; for study in the Division of University Students; d for courses taken on campus by undergraduate students in the College of Gen- l Studies:

Full-time program (12 to 18 hours), each semester	$1,025.00
Part-time program or hours in excess of 18, for each semester hour	74.00

r graduate study* in the Graduate School of Arts and Sciences, the hool of Education, the School of Government and Business Administra- n, and the School of Public and International Affairs; and for courses ken on campus by graduate students in the College of General Studies xception: doctoral students registered prior to July 1, 1967, who wish continue payments according to the plan (see below) in effect prior to it date):

For each semester hour for which a student registers	74.00

r students registered for doctoral degrees† in the Graduate Council ow the Graduate School of Arts and Sciences) and the School of Gov- ment and Business Administration prior to July 1, 1967, who wish to ntinue payments according to the plan in effect prior to that date:

For work leading to and including the general examination	2,050.00
For work leading to and including the final examination	2,050.00

r students registered for the Doctor of Education degree‡ prior to July 1967, who wish to continue payments according to the plan in effect or to that date:

For work leading to and including the major field examination	2,560.00
For work leading to and including the final examination	1,540.00

iversity Center Fee (charged all students registered on campus,§ nonrefundable)

r students registered for 11 or more semester hours on campus:

Each semester	37.50

r students registered for less than 11 semester hours in a semester on npus:

For each semester hour for which the student registers	3.50

ayment of tuition for a Master's thesis entitles the candidate, during the period of registration, the advice and direction of the member of the faculty under whom the thesis is to be written. case a thesis is unfinished, additional time may be granted in accordance with the regulations he school in which the student is registered.

he tuition fee is to be paid at the rate of $512.50 a semester or in full at the beginning of each ge of the doctoral discipline. No "continuous registration" fee will be charged if a third year eeded for completion of either part of the degree requirements. If still more time is needed, student must maintain continuous registration and pay the continuous registration fee s long as there is an unpaid balance for the part of the program on which the student is rking, he must make at least the minimum tuition payment of $256.25 at each fall and spring stration (and for any summer session in which he registers for academic work).

f the total fee is paid for the part of the program on which the student is working, he may tinue to register, without additional fee, for courses approved by his Master in Research, until expiration of the time allowed for that part of his program.

udents in the College of General Studies are charged the University Center Fee only when stered for courses on campus.

For students maintaining "continuous registration" status:

Each semester ..... $

Additional Course Fees

In certain courses additional fees, such as laboratory and material fees, are char as indicated in the course descriptions. These fees are charged by the semester a unless otherwise indicated, may be defrayed in two payments when the tuition is p in this manner. Breakage of apparatus is charged against the individual stude When breakage is in excess of the normal amount provided for in the laboratory the individual student will be required to pay such additional charges as are de mined by the department concerned.

Graduation Fees

Associate in Arts	$10
Bachelor's, Master's, Education Specialist, Doctor's degrees	25
Post-Master's Graduate Certificate in Health Care Administration	25
Fee for Binding Master's Thesis	10
Fee for Microfilm Service and Printing Announcement of Final Examination (Doctoral candidates)	60

Residence Hall Fees (see page 57)

Special Fees

Application fee (degree candidate), nonrefundable	25
Tuition deposit, nonrefundable:	
Charged each entering or readmitted full-time undergraduate student, except early decision freshmen	100
Charged each freshman admitted by the early decision plan	200
Application for room reservation, nonrefundable:	
Charged each resident student except early decision freshmen	100
Charged each student admitted by the early decision plan	200
Admission tests (when required)	6.00–12
National Teacher Examinations fee, for Bachelor of Arts in Education degree candidates	9.00–13
Late-registration fee, for failure to register within the designated period	15
Late-payment fee, for failure to make payments when due (see "Payment of Fees," pages 31–32)	15
Financial reinstatement fee, for reinstatement after financial encumbrance for nonpayment of fees (see "Payment of Fees," pages 31–32)	35
Returned check fee, charged a student whose check is returned because of insufficient funds or improper drafting	15
Continuous Registration fee, to maintain "continuous registration" status during any semester of absence from the University or after completion of tuition requirements*—due and payable on the official days of registration	74

* Payment of the continuous registration fee entitles the student who is granted leave of abse to return and continue his work toward a degree under the academic requirements which were force at the time of his first registration. The continuous registration fee applies toward neit tuition fee nor residence requirements for the degree.
This fee does not apply to students granted military leave. see page 48

or special physical examination	$2.00
r each examination to qualify for advanced standing and for each special examination	5.00
nglish test for foreign students (when required)	5.00
boratory checkout fee, for failure to check out of Chemistry laboratory by the date deadline set by the instructor*	$3.00
anscript fee, for each transcript of record	2.00

egistration for on-campus courses in the University entitles each student to e following University privileges: (1) the services of the Student Career rvices Office; (2) the use of the University Library; (3) gymnasium privies; (4) admission to all athletic contests, unless otherwise specified; (5) subription to the *University Hatchet*, the student newspaper; (6) admission to niversity debates; (7) medical attention as described under Student Health rvices. These privileges terminate when the student withdraws or is disssed from the University.

PROJECTED TUITION INCREASES 1972–75

order that students and their parents may plan more realistically for a total ur-year period, tuition increases for the academic years 1972–73, 1973–74, d 1974–75 have been estimated as follows:

crease by year (full-time undergraduate students):

1972–73	$150.00
1973–74	150.00
1974–75	75.00

crease by semester hour (graduate and part-time undergraduate students):

1972–73	6.00
1973–74	6.00
1974–75	4.00

Every effort will be made to keep tuition increases within the above limits. owever, it is not possible to project future economic data with certainty, and rcumstances may require an adjustment in these estimates.

PAYMENT OF FEES

o student is permitted to complete registration or attend classes until all arges are paid. Tuition and fees for each semester are due and payable in ll at the Office of the Cashier at the time of each registration. Checks and stal money orders should be made out to George Washington University.

The Student Accounts Office has responsibility for billing and maintaining dent accounts for tuition, various fees, and room and board charges. A stunt registered for 6 semester hours or more may sign a deferred payment ntract with the Student Accounts Office at the time of each registration pertting him to pay one-half of the total tuition and fees (except for fees payle in advance) at the time of registration and the remaining half on or be-

* student who drops a Chemistry course before the end of the semester must check out of the oratory at the next laboratory period.

fore November 3, 1971 (for the fall semester), and March 15, 1972 (for spring semester). Interest at the rate of 8 per cent per annum on the unp balance will be charged from the date of registration to the date paymen made. The University will not obligate itself to notify the student, in advan of the payment-due date for the second half of the semester charges.

Students receiving tuition assistance in the form of scholarships, gov ment tuition contracts, or other forms of tuition awards are not permitted sign deferred payment contracts unless the total tuition and fee charges exc the value of the tuition awards by $465 or more. Under such circumstan the student may be permitted to pay one-half of the amount due from student at the time of registration and to defer the balance by signing a ferred payment contract.

Students who fail to make any payment when due will be automatic charged a $15 late payment fee. Accounts which become 30 days past due be financially encumbered and will be subject to the interest charge of 8 cent per annum. In the event a student's account is financially encumbered, student forfeits his rights to the use of deferred payment contracts in future mesters, and the Student Accounts Office will notify the Registrar to withh grades, future registration privileges, transcripts, diplomas, and other acade information until the account is settled financially. Financial settlement will quire payment in full of all amounts due the University in addition to a fi cial reinstatement fee of $35.

Students auditing courses are subject to all fees charged to students r tered for credit.

Because many parents may wish some option in meeting and financing al part of the cost of a college education, the University offers educational plans through the Girard Trust Bank in Philadelphia, Pa.; Funds for Edu tion, Inc., Manchester, N.H.; and The Riggs National Bank, Washington, D

Although similar in purpose, these plans vary somewhat in coverage conditions. One-year and multiple-year plans are available. Insurance cover the life and health of the sponsor is provided through these plans.

Individuals over twenty-one years of age who are employed full-time also eligible to apply. They may sponsor their own contracts, provided meet the conditions specified by the plan for which they are applying.

Brochures and applications describing these plans are available in the O of Student Financial Aid.

WITHDRAWALS AND REFUNDS

Applications for withdrawal from the University or for change in class sch ule must be made in person or in writing to the dean of the college, sch or division in which the student is registered. Notification to an instructo not an acceptable notice (see "Withdrawal," page 46).

Refunds are granted only during the fall and spring semesters; no refu are granted during the summer sessions. In authorized withdrawals changes in schedule, cancellations of semester tuition charges and fees will made in accordance with the following schedule:

1. *Complete withdrawal from the University:*

FALL SEMESTER

Withdrawal dated on or before September 17, 1971.....90 per cent
Withdrawal dated September 20 to October 1, 1971.....75 per cent
Withdrawal dated October 4 to October 15, 1971.....50 per cent
Withdrawal dated after October 15, 1971.....none

SPRING SEMESTER

Withdrawal dated on or before January 28, 1972.....90 per cent
Withdrawal dated January 31 to February 11, 1972.....75 per cent
Withdrawal dated February 14 to February 25, 1972.....50 per cent
Withdrawal dated after February 25, 1972.....none

2. For a *change in status from full-time to part-time student* or for *partial withdrawal by a part-time student,* the above schedule applies to the difference in charges between the original program and the adjusted program continuing in effect.
3. A student enrolled in a full-time program who drops or adds a course and continues to be in a full-time program will have no financial adjustments of tuition made other than those involving course fees.
4. A student who is granted military leave before completing the semester will receive credits for current charges in accordance with the schedule for complete withdrawal from the University (see No. 1 above). Payments made in excess of the nonrefundable balance will be refunded to the student. The nonrefundable balance will be maintained as a deferred credit for use by the student when he returns to the University (see "Military Leave," page 48).
5. Regulations governing student withdrawals as they relate to residence hall and food service charges are contained in the specific lease arrangements.

In no case will tuition be reduced or refunded because of absence from classes. Payment applies only to the semester for which a registration charge is incurred and will not be credited to another semester (exception: students granted military leave, see page 48).

Authorization to withdraw and certification for work done will not be given a student who does not have a clear financial record.

Students are encouraged to provide their own cash funds until they can make banking arrangements in the community.

Financial Aid

FOR UNDERGRADUATE STUDENTS*

GEORGE WASHINGTON UNIVERSITY has, for undergraduate students, a program of financial assistance consisting of scholarships, loans, grants, part-time employment, or any combination of these resources. The University participates in the

* For information concerning financial aid for students from foreign countries, see page 39.

National Defense Student Loan, Educational Opportunity Grant, and Colle Work-Study programs. Financial aid is awarded on the basis of the studen scholastic record, financial need, and qualities of leadership and character.

Scholarships are awarded for the academic year.

Applications and supporting credentials for financial aid must be filed February 1 (entering freshmen), March 1 (enrolled undergraduate or enteri transfer students) preceding the academic year of the award for the fall seme ter; by October 31, for the spring semester; and by May 1, for the summ session*. A student must reapply for financial aid each year.

An undergraduate transfer student is not eligible for scholarship funds un the academic year following completion of one full semester (15 hours) at th University with a minimum average of High Pass or *B*. A transfer student however, immediately eligible for other types of financial aid.

Complete information concerning financial assistance is contained in t pamphlet "Student Financial Aid," which is available at the Office of Stude Financial Aid, George Washington University, Washington, D.C. 20006.

The following scholarships are available to students in Columbian College Arts and Sciences, the School of Education, the School of Government a Business Administration, and the School of Public and International Affai The University also offers many other scholarships which are available to st dents in these colleges and schools.

The George Washington University Board of Trustees Scholarships.—Fu and partial-tuition scholarships, which will begin in the fall semester and exte for four successive academic years, provided the holder maintains a High P or *B* average, as well as a high standard of deportment, and continues to be financial need. Candidates must plan to select a curriculum leading to a Bach lor's degree in any school of the University, except the College of General Stu ies. Students who have demonstrated outstanding ability in interscholas speech and debate activities are eligible for the George F. Henigan Scholarshi in Debate which are included among these scholarships.

SCHOLARSHIPS

Achievement Rewards for College Scientists (ARCS) Foundation, Inc., Scholarship
Sherman Page Allen Memorial Scholarship Fund (1966)
Alumni Scholarships
American Society of Women Accountants—District of Columbia Chapter—Scholarship in Accounting (1953)
Mary J. Anderson Scholarship (1969)
Byron Andrews Scholarship (1920)
Henry N. Brawner, Jr., Foundation Scholarship Fund (1963)
Emma K. Carr Scholarships (1932)
Maria M. Carter Scholarship (1871)
Paul E. Casassa Memorial Foundation Scholarship (1968)
Chi Omega Alumnae Scholarship (1966)

* A Summer Sessions student is eligible for consideration only if he is enrolled in this Univers for at least 8 semester hours in the immediately preceding spring semester or has applied financial aid for the following fall semester.

olumbian Women Scholarship Funds
Victoria Briggs Scholarship Fund (1959)
Elizabeth V. Brown Scholarship Fund (1925)
Grace Ross Chamberlin Scholarship Fund (1932)
College Women's Scholarship Fund (1926)
Columbian Women Members' Scholarship Fund (1961)
Arline Hughes Dufour Scholarship Fund (1961)
Dr. Watson W. Eldridge, Jr., and John F. Eldridge Scholarship Fund (1964)
Founders of Columbian Women Scholarship Fund (1920)
Rose Lees Hardy Foundation Scholarship Fund (1957)
Lillian Young Herron Scholarship Fund (1925)
Nellie Maynard Knapp Scholarship Fund (1915)
Marcia B. Kraft Scholarship Fund (1966)
Janet McWilliams Scholarship Fund (1954)
Marie-Louise Ralph Turner Scholarship Fund (1963)
Daughters of the American Revolution Scholarship (1952)
saac Davis Scholarship (1869)
District of Columbia Institute of Certified Public Accountants Scholarship in Accounting (1964)
Stella Constance Drane Scholarship (1957)
Robert Farnham Scholarship (1871)
Federal Government Accountants Association—Washington, D.C., Chapter—Scholarship in Accounting
Esther Brigham Fisher Scholarship (1951)
Foreign Student Scholarships (see page 39)
Friendship Business and Professional Women's Club Scholarship (1967)
General Motors College Scholarship (1955)
Georgetown Business and Professional Woman's Club Scholarship (1958)
Giant Food, Inc., Scholarship Intern Program
Mildred Green Memorial Scholarship Fund (1959)
nna Spicker Hampel Scholarship (1949)
ulian O. Hargrove Scholarship (1968)
lma Lewis Harvey Scholarship (1921)
Hazleton Scholarship (1950)
George F. Henigan Scholarships in Debate (1967)
David B. and James L. Karrick, Jr., Scholarship Fund (1968)
amuel and Elizabeth Kay Scholarships (1969)
mos Kendall Scholarship (1869)
. Poe Leggette Memorial Scholarship Established by WRGW (1968)
Mitchell-Stancioff Scholarship (1967)
. Morehouse Scholarship (1861)
Helen Marie and Thomas E. Orr Scholarships (1965)
hi Delta Gamma Scholarship (1956)
red B. and Alma D. Pletcher Scholarship Fund (1968)
evin M. Powell Scholarships (1886)
Research Assistantships in Operations Research and Related Fields (see pages 36–37)
esident Assistantships (see page 37)
Henry Whitefield Samson Scholarship Fund (1966)
ula M. Shepard Scholarships (1946)
igma Delta Chi Foundation of Washington, D.C. Scholarships

Margaret Lucille Snoddy Scholarship (1970)
David Spencer Scholarship (1918)
Mary Lowell Stone Scholarship (1893)
Charles Clinton Swisher Scholarships (1941)
Tau Kappa Epsilon Scholarship (1959)
U.S. Office of Education Traineeships (1964)
University Hospital Scholarships in Medical Technology
University Players Scholarship in Memory of L. Poe Leggette (1968)
University Women's Club, Inc., Memorial Fund Scholarship (1967)
William Walker Scholarship (1824)
Abigail Ann Brown and Henry Kirk White Scholarship Fund (1963)
John Withington Scholarship (1830)
Women's Physical Education Alumnae Association Scholarship (1964)
William G. Woodford Scholarship (1969)
Ellen Woodhull Scholarship (1919)
Zonta Club Scholarship (1950)

GRANTS

The following funds have been established to meet the special needs of disa vantaged students from the District of Columbia Inner-City and the Washingto metropolitan area.

Educational Opportunity Grants
George Washington University's Educational Opportunity Program Tuition Grants (1968)
Key Club of Walt Whitman High School, Bethesda, Md., Grant (1968)
Marriott Foundation Grant (1968)

FOR GRADUATE STUDENTS*

The George Washington University program of financial assistance for gradua students includes assistantships, fellowships, traineeships, graduate scholarship research appointments, part-time employment, and loans. Application for a mission to graduate study is a prerequisite for consideration. The Universi participates in the National Defense Student Loan and College Work-Stud programs.

Application and correspondence concerning assistantships, fellowships, trai eeships, or graduate scholarships should be sent directly to the dean of th school concerned, and addressed to George Washington University, Washin ton, D.C. 20006. Unless otherwise specified, application and supporting crede tials should be submitted no later than February 1 preceding the academic ye for which the award is made.

A separate application for National Defense Student Loans or the Colle Work-Study Program must be submitted to the Office of Student Financial Ai Applications for National Defense Student Loans must be submitted by April for the following academic year.

ASSISTANTSHIPS

Research Assistantships in Operations Research and Related Fields.—Ava able to graduate students, juniors, and seniors, in any college or school of th

* For information concerning financial aid for students from foreign countries, see page 39.

University. Research Assistants are expected to work 20 hours a week conducting research in support of an established research program, in programming or in conducting individual research on an approved research project. Stipends vary from $3,124 to $6,449, depending on the status of the student and the tenure of the appointment (9–12 months). Applications must be received prior to March 1. Further information and applications are available from the Director, Institute for Management Science and Engineering, School of Engineering and Applied Science, George Washington University, Washington, D.C. 20006.

Resident Assistantships (men and women).—Available to graduate students and seniors in any field of study who are interested in working with the student personnel program in University residence halls. Specific duties vary with the position, but basically consist of counseling, advising student groups, and administration. Remuneration includes full tuition and a furnished room for the academic year. All positions are part-time, enabling staff members to enroll as full-time students. Application should be completed before March 1. Further information may be obtained from the Office of the Dean of Students.

Arlington County—George Washington University Cooperative Assistantship Program

Health Care Administration Research Assistantships

National League of Cities/George Washington University Assistantship

Urban Affairs Assistantship

FELLOWSHIPS, INTERNSHIPS, TRAINEESHIPS, SPECIAL PROGRAMS

The following fellowships, internships, and traineeships are available to students in the Graduate School of Arts and Sciences, the School of Education, the School of Government and Business Administration, and the School of Public and International Affairs. The University also offers many other fellowships which are available to students in these colleges and schools. Complete information is contained in the pamphlet "Student Financial Aid," which is available at the Office of Student Financial Aid, George Washington University, Washington, D.C. 20006.

Graduate Teaching Fellowships.—Available to graduate students in Master's and doctoral programs in most departments of the University. Each teaching fellow renders a designated unit of service to his major department of instruction and receives a stipend of up to $2,800 (on a 9-month basis), plus tuition and course fees.

Research Traineeships.—Available under numerous sponsored programs in a number of departments. Currently, the basic medical science departments and the departments of Psychology and Speech and Drama offer such programs. Stipends vary; information is available from the departments and the Office of the Dean of the Graduate School of Arts and Sciences.

Achievement Rewards for College Scientists (ARCS) Foundation, Inc., Fellowship

American Civilization Fellowships

American Civilization Internships (Smithsonian Institution-George Washington University Cooperative Program)

Winfield Scott Blaney Fellowship in International Affairs (1961)

Thomas Alva Edison Fellowship

Elementary Teacher Education Internships

Foreign Student Fellowships (see page 39)
Health Care Administration Fellowships
Isabella Osborn King Research Fellowships (1927)
Loula D. Lasker Fellowships in Housing, City Planning, or Urban Renewal
Mellon Foundation Fellowships
Minorities in Planning and Related Professions Program
National Defense Education Act Fellowships
National Endowment for the Humanities Fellowships
National Historical Publications Commission-George Washington University Cooperative Research Fellowships
National Science Foundation Graduate Fellowships
National Science Foundation Graduate Traineeships
Rose Bibliography Internships
Thomas Bradford Sanders Fellowships (1928)
Scottish Rite Fellowships
U.S. Office of Education Fellowships (1964)
U.S. Public Health Service Traineeships
U.S. Public Health Service Traineeships in Comprehensive Health Planning
Urban Studies Fellowships of the Department of Housing and Urban Development
Urban Transportation Center Fellowship

GRADUATE SCHOLARSHIPS

Emma K. Carr Scholarships (1932)
Paul H. and Margaret M. DeMaine Scholarships (1967)
District of Columbia Institute of Certified Public Accountants Scholarship in Accounting (1964)
Gamma Phi Beta Sorority Scholarships (1962)
Mitchell-Stancioff Scholarship (1967)
Paul Pearson Scholarship Fund (1940)
Phi Delta Gamma Scholarship Fund (1968)
Voorhees Scholarships
Wolcott Foundation Scholarships

SPONSORED AWARDS FOR GRADUATE STUDY

General information regarding awards sponsored by foundations, professional and learned societies, industries, and others which may be used in support of graduate study is available at the Graduate Fellowship Information Center to students enrolled at George Washington University. Information is available on the prestige programs such as the Rhodes, Marshall, Woodrow Wilson, Fulbright, Rotary International, and Danforth, as well as many others.

As deadlines for application vary, qualified students should make inquiries well in advance of the year of planned graduate study.

LOAN FUNDS

The following loan funds are available to undergraduate and/or graduate students in Columbian College of Arts and Sciences, the Graduate School of Arts and Sciences, the School of Education, the School of Government and Business Administration, and the School of Public and International Affairs. Complete

formation is contained in the pamphlet "Student Financial Aid," which is vailable in the Office of Student Financial Aid, George Washington University, Vashington, D.C. 20006.

merican Medical Association Nursing Home Administration Loan Fund
oreign Student Loan Fund (1967)
.K. Kellogg Foundation Hospital Administration Loan Fund
ssie B. Martin Loan Fund (1967)
ational Defense Education Act Student Loan Program
ate Guaranteed Loan Program
llis H. Stearman Emergency Loan Fund
.S. Loan Program for Cuban Students
nited Student Aid Fund Loan
niversity Student Emergency Loan Fund

STUDENT EMPLOYMENT

he Student and Alumni Career Services Office maintains a registry of both ll-time and part-time positions available in the Washington area for under-raduate and graduate students.

After registration, students may apply at the Student and Alumni Career ervices Office, Woodhull House, 2033 G Street, N.W., for interviews and re-rrals to positions for which they are qualified.

FOREIGN STUDENTS

ndergraduate foreign students with proven financial need who have completed ne semester of full-time work (15 hours) at this University with a High Pass *B* average are eligible for consideration for the Board of Trustees Scholar-ips. Scholarships are awarded in the spring for the following academic year. ee instructions for applying for undergraduate financial aid, pages 33–34.

Limited awards for graduate teaching fellowships are the responsibility of the airman of the department or dean of the school in which the degree is to be rned. Work as a teaching fellow requires excellent knowledge of English—oth spoken and written.

Long-term loan funds for undergraduate and graduate foreign students are mited in amount and are available only to those foreign-born persons who have tablished resident status in the United States through the Immigration and aturalization Service.

We suggest that students who wish to study in the United States have avail-ble sufficient funds to cover expenses for one full year before attempting to nter a college or university. The cost at this University for one academic year September–May) is approximately $5,000. This estimate includes room and oard, tuition, books, clothes, and incidental expenses; no travel, holiday, or edical expenses are included.

LAW ENFORCEMENT EDUCATION PROGRAM

his program of grants and loans, authorized under the provisions of the Omni-us Crime Control and Safe Streets Act of 1968, is intended to help pay the

cost of educational expenses of officers who are employed by publicly fu
law enforcement or correctional agencies. Studies may be full- or part-tim
a wide range of subject areas and degree goals. Priority will be given to off
on the state and local levels, and to veterans of the Armed Forces of the Un
States. Applications and further information are available in the Office of
dent Financial Aid.

Prizes

Alpha Chi Sigma Prizes.—A *Handbook on Chemistry and Physics* awar
annually by Alpha Pi Chapter to each of three students who carry at least
semester hours during the freshman year and attain the highest averages
freshman chemistry.

The name and year of graduation of the student who has attained the hi
est academic record in courses in chemistry is inscribed on a bronze plaq
The winner must have had at least 16 hours in chemistry including the fi
semester at this University.

Alpha Kappa Psi Prize.—A key, awarded annually by Beta Mu Chapter
the male student who has completed 90 semester hours at this University
attained the highest average grade in business administration, economics, int
national business, public accounting, and public finance. The name of the w
ner and the year of the award are engraved on a plaque in the Office of
Dean of the School of Government and Business Administration.

American Institute of Chemists Prize.—A medal awarded annually to
graduating student majoring in chemistry who excels in scholarship, integr
and leadership.

The Walter G. Bryte, Jr., Achievement Award.—Provided by Walter
Bryte, Jr., Colonel, U.S. Air Force (retired), first Professor of Air Science
George Washington University. The award is presented annually primarily
that undergraduate residence hall, secondarily to any other activity at the U
versity, which has shown, under the leadership of its elected or designated he
the most improvement or excellence in its support of the principles and ai
of the United States of America and George Washington University. The h
or other activity will be awarded a cash prize, and the name of its leader
his hall or activity will be engraved on a silver trophy.

Byrne Thurtell Burns Memorial Prize.—Awarded to the senior majoring
chemistry who shows the greatest proficiency in organic chemistry, as evidenc
by a comprehensive examination, and who possesses such qualifications
mind, character, and personality as to give promise of future achievement.

Business Administration Prize.—Awarded annually by the Department
Business Administration to the outstanding graduating senior in the accounti
business administration, or international business degree program on the ba
of scholarship, leadership, and service to the University.

Wilbur J. Carr Prize.—Established in 1962 by Edith K. Carr, former Tru
tee of the University, in memory of her distinguished husband, who was gra
uated from the School of Comparative Jurisprudence and Diplomacy in 18
It is awarded annually to that man in the graduating class of the Univers
who has demonstrated outstanding ability in his study of international affa

and who has given evidence of possessing in marked degree the qualities which produce the good citizen and the dedicated public servant.

The Chemical Rubber Co. Freshman Chemistry Achievement Prize.—A *Handbook of Chemistry and Physics* awarded annually to the freshman student who has demonstrated the greatest achievement in Chemistry 15–16.

The Columbian Women Prize.—Awarded to the senior woman who in her undergraduate life has most nearly fulfilled the objectives of Columbian Women.

John Henry Cowles Prizes.—Two prizes, established by John H. Cowles, Grand Commander of the Supreme Council of Thirty-third Degree (Mother Council of the World) of the Ancient and Accepted Scottish Rite of Freemasonry, Southern Jurisdiction of the United States of America. Awarded annually to the senior in the School of Government and Business Administration and to the senior in the School of Public and International Affairs with the highest academic averages.

DeWitt Clinton Croissant Prize.—Awarded annually to the undergraduate student enrolled in a course in drama or active in University dramatics who submits to the English Department the best essay on drama or the theater.

E.K. Cutter Prize.—Established by Marion Kendall Cutter "for excellence in the study of English." Awarded to the member of the graduating class whose record in English, combined with general excellence, shows most marked aptitude for and attainment in English studies.

Isaac Davis Prizes.—Established in 1847 and awarded annually to the three seniors who have made the greatest progress in public speaking while enrolled in the University. Awards are to be determined by a public-speaking contest in which the participants deliver original orations. Only members of the senior class of Columbian College of Arts and Sciences who are candidates for the degree of Bachelor of Arts or Bachelor of Science are eligible to compete.

Delta Gamma Prize.—Awarded annually by Beta Rho Chapter to the woman who, at the end of her freshman year, has the most outstanding record in scholarship, extracurricular activities, and service to the University.

Elton Prize.—Established by the Reverend Romeo Elton, of Exeter, England, and awarded annually to the student with the highest average in the most advanced course in the Greek language and literature.

Jesse Frederick Essary Prize in Journalism.—Established by Helen Essary Murphy and awarded annually to a student who has given promise of sound citizenship and who submits the best printed and published evidence of ability in "forthright reporting" and good journalistic writing, in a student publication or elsewhere.

Joshua Evans III Prize in Political and Social Sciences.—A memorial prize "established by friends because of an outstanding life." Awarded annually to that man in the graduating class "who has demonstrated his signal ability in the social and political sciences and who has given promise of the interpretation of that ability in good citizenship among his fellows."

Willie E. Fitch Prize.—Established by James E. Fitch in memory of his son. Awarded annually to a senior student for the best examination in chemistry.

Alice Douglas Goddard Prize.—A memorial established by Frederick Joseph Goddard, of Georgetown, D.C. Awarded annually to the upper-division student making the highest average in American literature.

Edward Carrington Goddard Prize.—Established by Mary Williamson Goddard, Alice Douglas Goddard, and Frederick Joseph Goddard, of Georgetown, D.C., in memory of Edward Carrington Goddard, class of 1881. Awarded to

the junior or senior student making the highest average in the French langua and literature.

Morgan Richardson Goddard Prize.—A memorial established by Mary W liamson Goddard, Alice Douglas Goddard, and Frederick Joseph Goddard, Georgetown, D.C. Awarded to the junior or senior student making the high average in the following fields: business administration, economics, intern tional business, or public accounting.

Gardiner G. Hubbard Memorial Prize in United States History.—Establish by Gertrude M. Hubbard in memory of her husband and awarded annually that member of the graduating class majoring in history who has maintain the highest standing in courses in United States history.

International Business Prize.—Two prizes awarded annually by the Scho of Government and Business Administration to students in the internation business degree program, one awarded to a graduating senior and one award to a graduate student.

Kappa Kappa Gamma Prize.—Awarded annually to a full-time lower-div sion student for excellence in Biological Sciences 12.

David Lloyd Kreeger Prizes in Art.—Five prizes given by Mr. Kreeger, thr in the fine arts and two in art history and theory (including museology). Fi arts prizes are awarded to a senior or graduate student in painting, sculptur and graphics or design. One prize in art history and theory is awarded to senior and one to a graduate student. Candidates for the prizes must subm original papers or works of art. Winners are selected by distinguished repr sentatives of the field of art in the Washington, D.C., area.

Minna Mirin Kullback Memorial Prize.—Established in 1968 by Solom Kullback in memory of his wife. Awarded annually by a committee of facul members of the Department of Statistics to a full-time undergraduate or gra uate student majoring in statistics, who will have completed 18 semester hou of statistics courses by the end of the spring semester.

Craig Sterling Logan Memorial Prize.—Established by Washington City Ri Chapter of Sigma Alpha Epsilon. A plaque awarded annually to an outstan ing freshman man of high academic achievement who has participated extracurricular activities for the betterment of the University.

Mortar Board Prize.—A silver cup awarded annually to the woman stude in the sophomore class having an average of *B* (or equivalent) or higher an the most outstanding record in activities.

Vivian Nellis Memorial Prize.—Awarded to a student in the English Depar ment who has shown special promise in the field of creative writing.

Omicron Delta Kappa Prize.—A plaque awarded annually by Alpha Del Circle to "that member of the senior class who throughout his course has don the most constructive work in the furtherance and upbuilding of the Universi student activities."

Order of Scarlet Prize.—Awarded annually by the Board of Governors Order of Scarlet to that member of the sophomore class who has the most ou standing record in extracurricular activities and service to the University.

Panhellenic Association of Washington, D.C., Prize.—A trophy to be award to the Panhellenic Sorority maintaining the highest yearly scholastic average the University for the previous year.

Phi Delta Kappa Prize.—Awarded annually by Beta Gamma Chapter to th outstanding senior man in the teacher education program in the School of Ed ucation.

Phi Eta Sigma Prize.—A choice book selected from the field of the recipi-nt's major, awarded annually by the George Washington University Chapter o the male student attaining the highest scholastic average in his first full emester of work. The winner's name is engraved on a plaque in the Office of he Dean of Columbian College of Arts and Sciences.

Pi Lambda Theta Prize.—Awarded annually by Alpha Theta Chapter to the utstanding senior woman in the teacher education program in the School of ducation.

Psi Chi Prizes.—Two prizes awarded annually by the George Washington niversity Chapter to the best undergraduate student in experimental psychol-gy and to the M.A. candidate submitting the best thesis in psychology.

Ruggles Prize.—Established by Professor William Ruggles in 1859, awarded nnually to a candidate for a Bachelor's degree for excellence in mathematics.

Hermann and Johanna Richter Schoenfeld Prize.—Established in grateful ppreciation of the inspired teaching and devotion to his students of Dr. Her-ann Schoenfeld, who for more than 20 years until his death in 1926 headed he Department of German. Hermann Schoenfeld, Ph.D., LL.D., was widely ecognized as a scholar of distinction whose presence on the faculty added restige to the University. This prize is given annually to a member of the raduating class for excellence in historical and cultural phases of German tudies.

Smith Kline & French Prize.—Awarded annually to the student who sub-nits the best undergraduate research project in psychology.

Society of Colonial Wars in the District of Columbia Prize.—A gold medal warded to a candidate for a graduate degree who, in the judgment of the Fac-lty of the Department of History, submits a thesis or dissertation demonstrat-ng excellence in historical research in American Colonial history. The Univer-ity reserves the right to withhold the award if no thesis or dissertation attain-ng the required degree of excellence is submitted.

Staughton Prize.—Established by the Reverend Romeo Elton and awarded nnually to the student making the best record in the most advanced course in he Latin language and literature.

James MacBride Sterrett, Jr., Prize.—Established in 1911 by Professor Ster-ett in memory of his son. Awarded annually to the student who obtains the ighest average in Physics 1 and 2.

Charles Clinton Swisher Historical Club Prize.—Established in 1936 by the harles Clinton Swisher Historical Club and augmented in 1941 by the bequest f Professor Swisher. Awarded annually to the student who submits the best ssay covering some phase of medieval history.

The Wall Street Journal Leadership Prize.—Awarded annually to a graduat-ng senior in the Bachelor of Business Administration degree program for utstanding leadership and service to the University.

Thomas F. Walsh Prize.—Established in 1901 and awarded annually to the tudent who submits the best essay in Irish history.

Alexander Wilbourne Weddell Prize.—Established in 1923 by Virginia Chase Veddell in memory of her husband. Awarded annually to a candidate for a egree who writes the best essay on the subject of "the promotion of peace mong the nations of the world." The prize essays shall become the property f the University and shall not be printed or published without the written onsent of the University. The University reserves the right to withhold the ward if no essay attaining the required degree of excellence is submitted.

Regulations

A STUDENT ENROLLED in the University is required to conform to the fol ing regulations and to comply with the rules and regulations of the col school, or division in which he is registered.

A student who withdraws or is suspended, or is otherwise absent from University for one semester or more, may re-enter and continue his work under the rules and regulations in force at the time of his return.

If a student knowingly makes a false statement or conceals material in mation on an application for admission, registration card, or any other Uni sity document, his registration may be cancelled. If such falsification is covered after the student has established an academic record at the Univer he may be subject to dismissal from the University. Such a student will ineligible (except by special action of the Faculty) for subsequent registra in the University.

ATTENDANCE

A student may not attend classes until registration is completed and fees are paid. He may attend only those classes for which he is registered. Re lar attendance is required. A student may be dropped from any course undue absence.

SCHOLARSHIP REQUIREMENTS

A student who fails to maintain the scholarship requirements of the colle school, or division in which he is registered may be dismissed from the U versity.

GRADES

Grades are mailed to the student through the Office of the Registrar at close of each semester. They are not given out by instructors.

UNDERGRADUATE

Columbian College of Arts and Sciences and *School of Public and Inter tional Affairs.*—The following grading system is used: *H*, Honors; *HP*, H Pass; *P*, Pass; *F*, Fail; *I*, Incomplete; *W*, Authorized Withdrawal. *CR*, Cre or *NC*, No Credit, is assigned only for Proseminar courses. Except for cour which specifically state that repetition for credit is permitted, a student may repeat for credit a course in which he has received a grade of Pass or bet unless required to do so by the department concerned. A written statement this effect must be submitted to the Registrar by the appropriate departmen chairman.

School of Education and *School of Government and Business Administ tion.*—The following grading system is used: *A*, Excellent; *B*, Good; *C*, Av age; *D*, Pass; *F*, Fail; *CR*, Credit; *NC*, No Credit; *I*, Incomplete; *W*, Authori Withdrawal. Except for courses which specifically state that repitition for cr is permitted, a student may not repeat for credit a course in which he has ceived a grade of *D* or above, unless required to do so by the department o

erned. A written statement to this effect must be submitted to the Registrar by he appropriate departmental chairman.

RADUATE

he following grading system is used: *A*, Excellent; *B*, Good; *C*, Minimum ass; *F*, Fail; *I*, Incomplete; *CR*, Credit; *W*, Authorized Withdrawal. Except or courses which specifically state that repitition for credit is permitted, a stu- lent may not repeat for credit a course in which he has received a grade of *C* r above, unless required to do so by the department concerned. A written state- nent to this effect must be submitted to the Registrar by the appropriate depart- nental chairman. In the Graduate School of Arts and Sciences this regulation slightly different (see page 91).

NCOMPLETE/AUTHORIZED WITHDRAWAL

Whenever a grade has not been assigned, the symbol *I* (incomplete) or the ymbol *W* (authorized withdrawal) will be recorded. The symbol *I* indicates hat a satisfactory explanation has been given the instructor for the student's ailure to complete the required work of the course. At the option of the in- tructor, the grade of *I* may be recorded if a student, for reasons beyond his ontrol, is unable to complete the work of the course, and if the instructor is nformed of, and approves, such reasons before the date when grades must be eported. The grade may be used only if the student's prior performance and lass attendance in the course have been satisfactory. Any failure to complete he work of a course which is not satisfactorily explained to the instructor efore the date when grades must be turned in will be graded *F*. If acceptable easons are later presented to the instructor, he may initiate an appropriate rade change. Although the grade of *I may* remain on the records for a maxi- mum of one year, the instructor should normally set a much briefer period vithin which the uncompleted work (usually the final examination or a re- quired paper) must be made up. The grade of *I* cannot be removed by re- egistering for the course here, or by taking its equivalent elsewhere. An "in- complete" cannot be made up after the lapse of one calendar year except by written permission of the dean's council of the college, school, or division con- cerned. An incomplete which is not removed within one calendar year is auto- matically changed to an *F*.

THE QUALITY-POINT INDEX*

Scholarship is computed in terms of the quality-point index, obtained by divid- ng the number of quality points by the number of semester hours for which he student has registered, both based on his record in this University. Quality oints are computed from grades as follows: *A*, four points; *B*, three points; , two points; *D*, one point; *F*, no points, for each semester hour for which he student has registered. Courses marked *W*, *I*, *NC*, or *CR* are not con- idered in determining the index, except that courses marked *I* will be con- idered when a formal grade is recorded. An incomplete which is not removed

* Applicable only to the Graduate School of Arts and Sciences, the School of Education, the chool of Government and Business Administration, and the *graduate programs* in the School of ublic and International Affairs.

within one calendar year is automatically changed to an *F*. Grades in cou
taken at another institution are not considered in computing the quality-p
index.

CREDIT/NO CREDIT OPTION

A junior or senior student in the School of Education or the School of G
ernment and Business Administration who has a cumulative quality-point in
of 2.50 or better, may, with the approval of his adviser and dean, take
course a semester and receive a grade of *CR*, credit, or *NC*, no credit, wh
will be recorded on the student's transcript but will not be reflected in
quality-point index. No student will be allowed to take more than 4 credit
credit courses. A student must sign up for such an option at registrati
Under no circumstances may a student change from credit/no credit status
graded status, or vice versa, after the end of registration. Courses required
the student's major field may not be taken on the credit/no credit basis.
transfer student may not choose this option until the second semester of
enrollment at this University.

FINAL EXAMINATIONS

Final examinations for undergraduate courses are scheduled at the end of e
semester by the Office of the Registrar. Examinations for courses numbe
201 or above are scheduled, if desired, by the individual department or inst
tor.

ACADEMIC DISHONESTY

Academic dishonesty on the part of any student will result in a disciplin
grade of *F* for the course involved and also may, upon the recommendat
of the appropriate dean's council, result in his suspension from the Univers
for a stated period, at the end of which time he may petition for readmiss
Upon approval of the appropriate dean's council, the disciplinary grade
"Failure—Academic Dishonesty" will be recorded for the course involved.
this grade will be employed in the computation of the quality-point index
academic standing. A student so suspended shall be withdrawn from all ot
courses except those in which all work has been completed.

WITHDRAWAL

Withdrawal from a course or from the University requires the permission
the dean of the college, school, or division in which the student is register
Permission to withdraw from the University will not be granted a student w
does not have a clear financial record (see pages 32–33).

Each college, school, and division of the University sets deadline dates
each semester concerning withdrawal. Withdrawal between these dates and
end of the semester is permitted only in exceptional circumstances.

*All charges for courses dropped without the approval of the dean must
met by the student. Reporting the dropping of a course to an instructor d
not effect its discontinuance.*

CHANGES IN PROGRAM OF STUDY

Changes within a College, School, or Division.—A student may not substitute one course for another, drop courses (see "Withdrawal," page 46), change his status from credit to audit or audit to credit without the approval of the dean of the college, school, or division in which he is registered.

Change from one section to another of the same course may be made with the approval of the dean and the department concerned.

Change from one major subject to another within the same college or school may be made with the approval of the dean. All requirements of the course of study to which the change is made must be met.

Transfer within the University.—Except in cases of normal progression from the lower division of Columbian College of Arts and Sciences in a regular baccalaureate program, application for transfer to another college, school, or division must be made to the appropriate admitting office on the form provided by that office and must be approved by the deans concerned. Application for transfer from the lower division of Columbian College to the upper division or to Bachelor's candidacy in the School of Education, the School of Government and Business Administration, or the School of Public and International Affairs must be made on the appropriate form. This form is available in the Office of the Dean of Columbian College.

A maximum of 45 semester hours earned in the Division of University Students may be applied toward a Bachelor's degree in a degree-granting college or school of the University. Work done in the Division of University Students will not be counted toward a graduate degree unless prior written approval, obtained from the relevant degree-granting college or school, has been filed in the Office of the Dean of the Division of University Students (see page 172).

Students transferring within the University are advised to study carefully the graduation requirements on page 48–49 and to note that in all undergraduate divisions, except the lower division of Columbian College of Arts and Sciences, 30 semester hours, including at least *12 semester hours* in the major field, must be completed while registered in the school or college from which the degree is sought. Upon transfer the student should consult the dean concerned and understand clearly the requirements he must fulfill. (For residence requirements in the lower division of Columbian College of Arts and Sciences, see pages 76 and 81.)

CREDIT

Credit is given only after registration for a course and satisfactory completion of the required work, or upon the assignment of advanced standing in accordance with the regulations of the several colleges, schools, and divisions.

Auditing.—In special instances, a person who has been admitted to the University may be registered, with the permission of the instructor, as an "auditor" in a class (no academic credit). An auditor is not required to take active part or to pass examinations. A student who takes a course as an auditor may not repeat it later for credit.

SUMMER SCHOOL CREDIT

A student who plans to attend summer school at another institution and apply credit so earned toward graduation from this University must first secure the

written approval of his dean. In no event will credit in excess of what be earned in a similar period in this University be recognized.

BALANCE SHEET

On request, the Registrar will issue to undergraduate degree candidates a ance sheet showing the amount of work completed and the requirement maining to be met for the degree. A second balance sheet is issued only i student changes major or degree objectives.

TRANSCRIPTS OF RECORD

Official transcripts of student records are issued on request of the studer former student who has a clear financial record. A fee of two dollars is cha for each transcript.

CONTINUOUS REGISTRATION

Degree candidates are expected to maintain continuous registration until *all* gree requirements are satisfied. Students who have completed course regis tion (including the thesis) must maintain continuous registration by paying "continuous registration" fee (see page 30). By failing to register for one mester or more, the student breaks his registration and must be readmitted ("Readmission," page 26). A "Readmitted Student" is required to satisfy curriculum requirements existing at the time of his readmission.

Students must be registered during the summer if they are taking cour are taking required examinations, are receiving guidance toward theses or sertations, or are expecting to graduate at the end of the Summer Sessions.

MILITARY LEAVE

A student called to active duty may be granted military leave for the period active duty, upon presentation to his dean of a copy of his orders and a p tion for such leave. The maintenance of "continuous registration" is not quired of the student on military leave; however, he must apply for readm sion to the University well in advance of the semester in which he expects return. Payments for tuition and fees which are not refunded to the student the time he is granted military leave will be maintained as a deferred credit his account and use upon his return to the University.

GRADUATION REQUIREMENTS

Degrees are conferred in February, May, and September.

To be recommended by the Faculty for graduation a student must have m the admission requirements of the college or school in which he is registere completed satisfactorily the scholarship, curriculum, residence, and other quirements for the degree for which he is registered; and be free from all debtedness to the University. Registration, either for course work or on "continuous registration" fee basis, is required for the semester or summer s sion immediately preceding the awarding of a degree.

Application for Graduation.—An "Application for Graduation" form *m* be filed and the appropriate fee paid at the time of registration for the last

ester or summer session of the senior or final year. Students completing degree requirements during the Summer Sessions will be awarded diplomas (no ormal convocation) September 30, *provided* they have completed all degree equirements and have applied for graduation as a part of registration for the ummer Sessions.

Scholarship.—The student must meet the scholarship requirements for the articular degree for which he is registered.

Curriculum.—Minimum curriculum requirements for each degree are stated nder the college or school offering work in preparation for the degree.

Residence.—Unless otherwise specified, in all undergraduate divisions of the niversity, a *minimum of 30 semester hours, including at least 12 hours in the ajor field, must be completed while registered in the school or college from hich the degree is sought.* This requirement applies to students transferring ithin the University as well as to students transferring from other institutions. ummer work may be counted toward the residence requirement, but in no ase may the period of residence aggregate less than thirty weeks. Unless speial permission is granted by the dean of the college or school concerned to ursue work elsewhere, the work of the senior or final year must be completed n the college or school from which the degree is sought.

The graduate student must meet the residence requirements for the particular degree for which he is registered.

National Teacher Examinations.—All candidates for the degree of Bachelor of Arts in Education are required to take the National Teacher Examinations.

Attendance and Conduct.—The University reserves the right to refuse to confer a degree upon a candidate whose attendance or conduct has been unsatisfactory.

Thesis or Dissertation.—A thesis or dissertation submitted in partial satisfaction of requirements for a degree must be presented in its final form to the lean of the college or school concerned no later than the date specified in the University Calendar.

Accepted theses and dissertations, with accompanying drawings, become the roperty of the University and are deposited in the University Library, where he duplicate copies are bound and made available for circulation. Permission o publish or adapt material in them must be secured from the appropriate lean. See the appropriate college or school in this catalogue for regulations overning theses and dissertations.

ONORS

ITH DISTINCTION

n all undergraduate divisions of the University the degree may be conferred With Distinction," at the discretion of the Faculty, if a student meets the specific requirements of his college or school, as follows:

1. Columbian College of Arts and Sciences or School of Public and International Affairs—the attainment of Honors grades in 60 per cent of the ourses taken at this institution; or

2. School of Education or School of Government and Business Administration—the attainment of a quality-point index of 3.50 or higher on all course ork taken at this institution.

To be eligible, a student must have completed at this institution at least one-alf of the courses required for the degree.

SPECIAL HONORS

Special Honors may be awarded by the Faculty to any member of the grad ing class for outstanding achievement in the student's major field on rec mendation of the major department. The student must fulfill all of the fol ing requirements:

1. He must have his candidacy for Special Honors approved by the fac member representing the major department or field not later than the be ning of the senior year.
2. He must meet such other conditions as may be set at the time his didacy is approved.
3. He must have completed at this institution at least one-half of the cou required for the degree.
4. He must fulfill the specific requirement of the college or school in wh he is registered, as follows: (a) Columbian College of Arts and Science the School of Public and International Affairs—attainment of High Pas Honors grades in 50 per cent of the courses taken at this institution; or (b) School of Education or the School of Government and Business Admini tion—maintain a quality-point index of at least 3.00 on all course work ta at this institution.

DEPARTMENTAL HONORS

The departments of English and History offer Departmental Honors if stud meet specific requirements. For details, see the appropriate department.

THE LIBRARY

All students registered in the University have the privilege of using the U versity Library. Its stacks are open, and all students are welcome to brows their leisure. The Student Identification Card, issued upon the payment of fe must be presented when books are borrowed for outside use.

The loan period for most books available for outside circulation is 30 d A fine of 25 cents is charged for each day a book is overdue. Any book wh circulates is subject to recall by the Library if needed for reserve or other Reserve books must be used in the reserve reading room when the Librar open, except that they may be withdrawn for overnight use beginning at 8 p.m. A fine of 50 cents is charged for each hour or fraction thereof tha reserve book is overdue. Grades of a student are withheld until his libr record is clear.

All students using the University Library are expected to be familiar with detailed regulations, available on application to any of the Library's ser desks.

RIGHT TO DISMISS STUDENTS

The right is reserved by the University to dismiss or exclude any student fr the University, or from any class or classes, whenever, in the interest of student or the University, the University Administration deems it advisable.

IGHT TO CHANGE RULES

he University and its various colleges, schools, and divisions reserve the right o modify or change requirements, rules, and fees. Such regulations shall go nto force whenever the proper authorities may determine.

IGHT TO MAKE CHANGES IN PROGRAMS

he right is reserved by the University to make changes in programs without iotice whenever circumstances warrant such changes.

NIVERSITY POLICY ON THE RELEASE OF STUDENT INFORMATION

n general, the policy of the University is one of attempting to keep the student's record confidential and out of the hands of those who would use it for ther than legitimate reasons. At the same time, the policy must be flexible nough not to hinder the student, the University, or the community in their egitimate endeavors.

No information concerning a student will be released except as noted below:

1. Information such as whether or not the student is currently enrolled; dates of attendance; verification of date and place of birth; degrees earned, if any, date, major field or area of concentration, and honors received; home and local addresses and telephone numbers; school, college, or division of enrollment, and class; verification of signature; name and address of parent or guardian.

2. The issuance of formal transcripts of record to recognized institutions of higher learning; the certification of academic achievement to the various recognized professional associations (law, medicine, engineering, education, etc.).

Additional information will be released only on written authorization from the student, or by court order or subpoena. If a subpoena is served, the student whose record is being subpoenaed will be notified and the subpoena will be referred to the University's legal counsel.

Government investigative agencies have no inherent right to access to student files and records. If expressly requested, properly identified representatives from federal, state, or local government agencies may be given the information listed under No. 1, above.

UNIVERSITY POLICY ON SELECTIVE SERVICE INFORMATION

The University notifies draft boards of a student's academic status only when the student requests or authorizes, in writing, that the draft board be notified. A Selective Service Information Card is put into the registration packet of each male student who has not reached his 26th birthday, registered on campus, exclusive of those in the National Law Center and the School of Medicine. This card contains the following statement:

> By my signature below, I hereby authorize the University, to notify my draft board of my academic status in the University, or of any changes in academic status that occur during this semester.

If the student signs the card, the University then automatically notifies the draft board. If the student does not sign the card, no notification is sent. National Law Center students and students in the School of Medicine should check with the appropriate dean's office for details of the policy in their school.

PROPERTY RESPONSIBILITY

The University is not responsible for the loss of personal property. A "L and Found" Office is maintained on campus in the Safety and Security Office.

RECENTLY ESTABLISHED REGULATIONS

An Appendix (pages 479–80) contains regulations recently approved by University's Board of Trustees.

Cooperative Programs

CONSORTIUM OF UNIVERSITIES OF THE WASHINGTON METROPOLITAN AREA, INC.

FIVE UNIVERSITIES in Washington, D.C.—American University, Catholic U versity of America, *George Washington University*, Georgetown Univers and Howard University—have formed a Consortium through which they coordinating the use of their respective facilities. As the arrangement develo juniors, seniors, and graduate students in approved programs leading to grees in any one of the universities will increasingly have the opportunity select from the combined offerings of all five universities the particular cour which best meet their needs.

Participation is limited to campus degree candidates. The following, ho ever, are excluded: freshman and sophomore students, and students in Ca Law, Dentistry, Medicine, and Theology. Law students are also excluded fr participation, except for candidates for the degree of Master of Laws at Geo Washington University and Georgetown University.

In special courses such as private instruction (as in music or art) or tuto study, if a special fee is charged, this fee is not covered by the Consorti agreement and must be paid by the individual student to the university admi tering the course. Courses offered in Reserve Officer Training Corps progra are excluded.

Students are encouraged to study the announcements of programs of all universities. See page 28 for information concerning registration for Cons tium courses. *A student may not take courses at another university that available at his own.*

Registration forms and instructions are available from the registrar of student's university. The student registers and pays at his own university all Consortium courses.

AIR FORCE RESERVE OFFICERS' TRAINING CORPS (AFROTC)

The Department of Aerospace Studies at Catholic University of America, un provisions of an agreement between George Washington University and C olic University, offers a two-year AFROTC program.

The successful completion of the program qualifies the student for a rese commission in the United States Air Force upon graduation. Exceptiona well-qualified students may receive a Regular Officer appointment. The p gram is designed to provide education that will develop skills and attitudes v

o the career professional Air Force Officer. Emphasis is placed on qualities f leadership and other attributes essential to progressive advancement into positions of increasing responsibility as commissioned officers in the Air Force.

Full-time students who have two years remaining toward a baccalaureate or graduate degree are eligible to enter the program. Each student must meet physical and mental standards set by the Air Force. Candidates must complete six weeks of Field Training, conducted by the Air Force at designated bases, during the summer preceding enrollment in the program. A student must have and maintain a quality-point index of 2.00 or its equivalent. Applications must be made *early* in the academic year prior to the one of enrollment in the program, so that all qualification criteria may be met in time for selection consideration in the spring.

The program is offered at Catholic University. At the time of enrollment, a registration fee must be paid. There is no tuition charge. Students in the program receive a monthly retainer fee of $50. Uniforms and textbooks are furnished without cost. Students participating in the Field Training phase are paid at a rate established by the U.S. Government and are also furnished travel to and from the Field Training base.

Interested students should consult the Department of Aerospace Studies, Catholic University of America, Washington, D.C. 20017.

GRADUATE STUDY AND RESEARCH PROGRAMS

The University and the Smithsonian Institution cooperate in a program in American Civilization leading to the degree of Doctor of Philosophy. Graduate academic work taken at George Washington University and special seminars and dissertation research in the museums of the Smithsonian Institution provide unusual opportunity to the student specializing in American Civilization.

A parallel cooperative program in American Civilization has been established by the University and the Library of Congress. Special seminars and reading courses and dissertation research in library-related subjects, together with the graduate academic work at the University, give the student an educational and training experience that only this combination can provide.

The University and the National Bureau of Standards have entered into a cooperative agreement to further educational opportunity at both the University and the Bureau. This arrangement holds great promise for graduate study and research, particularly in the physical sciences and engineering.

The Speech and Hearing Clinic

Director of Speech Pathology and Audiology, J.W. Hillis

THE SPEECH AND HEARING CLINIC offers diagnostic and remedial work for children and adults with such communication difficulties as stuttering, lisping, cleft-palate speech, cerebral-palsied speech, and voice, articulatory, and hearing problems. Diagnostic and remedial work is also available for persons with nonstandard language usage due to such conditions as hearing loss, brain damage, mental retardation, and environmental factors.

Fees.—The fee for an initial evaluation is $20. Fees for additional sp
ized testing are dependent on the testing involved. The fees for indiv
speech or hearing therapy range from $3 to $10 a session. Fees are red
for full-time students enrolled in the University and for persons receiving g
therapy. Fees are payable at the Office of the Cashier.

The Reading Center

Director, Mary Ellen Coleman

THE READING CENTER offers individual diagnostic and corrective services fo
levels: primary, elementary, secondary, and adult. In addition, special rea
improvement classes are conducted for high school and college student
well as other adults.

A complete diagnosis includes psychological tests; vision, hearing, d
nance, and spelling tests; and various types of reading achievement and
tude tests. Results are interpreted, and a written report is presented in con
ence with the parents or the individual.

The special reading improvement classes for high school students, col
students, and other adults are offered throughout the year at stated inter
Emphasis is placed on improvement of vocabulary, speed, comprehension,
study skills. Instruction in spelling is also provided as needed. Mechanical
such as the tachistoscope, rate accelerator, and controlled reader are availa
for increasing speed of comprehension.

Fees.—The fee for individual diagnosis is $60; for individual instruction,
a lesson; for semi-individual instruction, $6 a lesson; for instruction in sm
groups with common reading difficulties, $5 a lesson. Reading classes (15 t
hour sessions) are offered for adults, $100; for full-time George Washing
University students, $60. All fees are payable in advance at the Office of
Cashier.

Veterans Education

THE OFFICE OF THE REGISTRAR, Luther Rice Hall, 2121 Eye Street, N.W.,
sists students entitled to educational benefits as veterans or war orphans w
any problems which may arise concerning their benefits. This Office also pr
esses certification of enrollment and attendance to the Veterans Administra
so that monthly allowances will be paid.

When feasible, students entitled to benefits as veterans or war orphans sho
consult the Office of the Registrar prior to submitting application to the Ve
ans Administration. All such students should obtain the instruction sheet iss
by the Office of the Registrar, which sets forth requirements to be fulfil
before certification of enrollment can be made to the Veterans Administrat
and which includes other information of general interest.

The Veterans Administration is at 2033 M Street, N.W., Washington, D
20421.

University Computer Center

Director, R.E. Thomas

E UNIVERSITY COMPUTER CENTER is located on the first floor of Stuart Hall, 13 G Street, N.W. The facilities of the Center are available for academic rposes to all registered students and to members of the instructional staff. e Center has as its principal mission the provision of a powerful computing tem which serves the University in its educational and research endeavors. e Center's programming staff concentrates its efforts in conducting faculty d staff seminars, consulting with users in the preparation of complicated pro-ams, and carrying out computer-oriented research.

The Computer Center equipment consists of an IBM system 360 Model 50 mputer with 256,000 positions of core storage, a 2314-disk storage unit pro-ding on-line storage for more than 200 million characters, a card read/punch, high-speed line printer, and four tape drives. The principal languages avail-le to the user are FORTRAN IV, COBOL, Programming Language One PL/1), Assembler Language, and ALGOL. In addition, numerous utility, tistical, data manipulation, simulation systems, and special languages are ailable in the library of programs. Facilities are available on a first-come, st-served basis for preparation of programs and data.

Computer programming courses are offered by the School of Government d Business Administration, the Department of Statistics, and the School of ngineering and Applied Science. In addition, many other departments offer urses that utilize the computer as a research adjunct to course work.

The Computer Center is open 24 hours a day from 8 a.m. Monday to 4 p.m. turday.

General Alumni Association

HE OBJECTIVES OF THIS ASSOCIATION are to unite the graduates who wish to sociate themselves for charitable, educational, literary, and scientific pur-ses, and to promote the general welfare of the University.

Eligible members are those who have matriculated in any school of the Uni-rsity and who have left the University in good standing, or any person who or has been a member of the teaching, research, or administrative staff of the niversity, or of the Board of Trustees of the University. Active members are ose eligible members who are life members of the George Washington Uni-rsity General Alumni Association or the Alumni Association of any school of e University, or are current contributors to the George Washington University nd.

The Alumni Office is in Bacon Hall, 2000 H Street, N.W., Washington, D.C. 006.

All alumni are urged to keep the Alumni Office informed of changes of ad-ess or occupation and to supply information with regard to their fellow umni.

STUDENT LIFE

Vice President for Student Affairs W.P. Smith, Jr.
Assistant to the Vice President for Student Affairs D.G. Speck
Director of the Cloyd Heck Marvin Center B.C. Bell
Dean of Students Marianne Phelps

THE OFFICE OF THE VICE PRESIDENT FOR STUDENT AFFAIRS develops Stu Life programs, policies, and procedures to complement the University's fo instruction program. These activities are implemented through the office the Cloyd Heck Marvin Center, Dean of Students, Educational Opportu Program, Housing, International Students, Student Activities, Student Alumni Career Services, Student Health Service, and University Couns Center.

STUDENT SERVICES

OFFICE OF THE DEAN OF STUDENTS

Dean of Students Marianne Phelps
Assistant Deans of Students Elizabeth Garraway, Gary Hamer

The Office of the Dean of Students provides general counseling and infor tion services to individual students. In addition, the staff of this Office is sponsible for counseling and other programs within the residence halls. Dean of Students also works with the Adviser to International Students. Counselor and Coordinator of the Educational Opportunity Program, and Director of Housing in the implementation of their programs.

HOUSING

Director of Housing Ann Webster
Assistant Directors of Housing Karen Klinghoffer, George Ridler

Complete information concerning the University's residence halls is availa from the Director of Housing, George Washington University, Washing D.C. 20006. Information concerning off-campus housing near the Univer may be obtained at this Office. The reservation of rooms in private hou must be made by students.

Admission to the University does not include a room reservation. The dent will receive, with his notification of acceptance, University residence

nformation, an application for residence hall space, a medical examination orm, and a declaration of intent to attend the University. The medical examiation form must be completed by the applicant and his physician and returned o the Student Health Service Office. The application for residence hall space nust be accompanied by a $100 *nonrefundable deposit* ($200 for applicants dmitted by early decision). Early decision students *must* submit the deposit y January 15. The housing deposit is credited toward the semester's room harge. Rooms are leased for the academic year, and lease payment must be nade by July 15 for the fall semester.

1971–72 Residence Hall Rates per Person for Two Semesters*

	Room and Food Service	*Room Only*
For Men:		
Adams Hall		
double room	$1,350	$700
triple room	1,300	650
Calhoun Hall		
double room	1,375	725
triple room	1,325	675
Crawford Hall—double room	1,325	675
Madison Hall (graduate students and upperclassmen)		
double room	1,375	725
Mitchell Hall—single room	1,425	775
For Women:		
Graduate Women's Residence—apartment for three	——	775
Strong Hall (upperclass women)		
single room	1,425	775
double room	1,375	725
Thurston Hall		
double room, triple room, room for four	1,375	——
suite for six	1,325	——

FOOD SERVICE

Residents of Thurston Hall and all resident freshmen are required to participate in the food service plan. The plan is optional for all other residents. Well-balanced meals are served cafeteria style seven days a week (20 meals). Food service payment does not cover University intersession or vacation periods. All meal cards admit bearer to the dining rooms in Thurston Hall and Mitchell Hall. Residents of Calhoun, Crawford, Madison, and Strong halls are given preference for the use of the contract dining room in the Cloyd Heck Marvin Center.

MUNSON HALL APARTMENTS

Munson Hall is a University-owned and operated apartment house containing 15 one-bedroom and 54 efficiency apartments. Graduate and married students are given priority for residency until July 15 each year. Seniors and juniors who have lived at least one year in University residence halls will be consid-

* Rates and food service plan subject to change.

ered for residency after that date if space is available. All leases are for 12-month year.

EDUCATIONAL OPPORTUNITY PROGRAM

Counselor and Coordinator W.T. Trent

The Educational Opportunity Program is designed to offer a college educa for graduates of District of Columbia High Schools and/or other quali District residents. It provides an opportunity for a student to seek a de in almost any field and at the same time be assisted academically and fi cially.

CLOYD HECK MARVIN CENTER

Director B.C. Bell
Assistant Director D.L. Cotter
Financial Officer L.R. Moore

The Center encompasses a building, an organization, and a program. The bu ing is the University's center for community life. It is the physical instrum for implementation of the programs and objectives of the organization.

The organization, composed of students, faculty, administrators, and alu in the form of a three-board structure, provides an informal education med for individual and group activities adapted to the leisure-time interests needs of the University community. It also provides training for those dire involved in management of and programming for the Center.

The primary purpose of the Center is the continuing development of a bi cultural, intellectual, social, and recreational program. Its secondary purpo the provision of its various services and facilities to the campus community the development of community life.

The Center houses a wide range of facilities to serve the needs of the c pus, including dining rooms and a rathskeller, a bookstore, lounges and s areas, a theater, bowling lanes and a billiard room, a University Club, stu organization offices and workrooms, meeting and conference rooms, an in mation center, music listening rooms, social areas, shower and dressing ro lockers, and parking accommodations.

STUDENT HEALTH SERVICE

Director R.B. Castell, M.D.

The Student Health Service is an outpatient clinic designed to assist all re tered students with their health needs while attending the University. service, located at 935 22nd Street, N.W. (in the H.B. Burns Memorial Bu ing), assists with health conditions and medical emergencies by advice and t ment, proper referral when necessary, and cooperation with other physic and medical facilities.

During the academic year, the hours are 9 a.m. to 10 p.m., Monday thro Friday, and 9 a.m. to 12 noon on Saturday. The weekday hours during summer sessions are from 9 a.m. to 9 p.m.; Saturday hours are 9 a.m. to noon. A physician is in attendance during these hours.

For serious illnesses or emergencies that occur when the Student Hea Service is closed, students may call the Medical Bureau (223-2200), or

Emergency Room of the University Hospital for treatment. Charges for
th of these services are solely the responsibility of the student.
Charges for services that are not available through the Student Health Serv-
, such as X-ray and laboratory tests, specialty services, and consultations,
, must be paid by the student.
The Student Health Service is available only to those students who are cur-
tly enrolled in the University. A student who is not currently enrolled, or
e who has severed his connection with the University, is ineligible for this
vice. This service is not available between the last day of examinations for
emester or summer session and the completion of registration for the next
nester or summer session.
A student intending to train for an athletic team is required to pass a medi-
l examination. The University is not responsible for injuries received in
ercollegiate or intramural games, or in any of the activities of the Depart-
nt of Physical Education.

ALTH AND ACCIDENT INSURANCE

addition to the above service, the Student Health Service Office has ar-
nged for Health and Accident Insurance, on an elective basis, for *full-time*
dents. Arrangements for insurance coverage are the responsibility of the
dent. The University assists in the subscription process by administering
plication cards and collecting fees during official registration periods.
A student may subscribe and pay for the coverage *only* when he pays his
tion and other fees at registration. For those few students who register late,
subscription will be available during official late registration. *Subscription*
ring late registration will not be available for those students who previously
gistered and failed to subscribe at that time. Students who participate in the
mmer Advanced Registration Program must subscribe and pay for the cov-
ge on the appropriate date of the Summer Advanced Registration. Students
o participate in the pre-registration, conducted in April for the following
ll Semester, must subscribe for the coverage at the time of pre-registration
April. The fee will be included with the tuition bill and must be paid by
gust 1.
The fee charged provides coverage on a 6-month basis—September through
bruary for those subscribing for the fall, and March through August for
ose subscribing for the spring. The coverage is effective, with minor varia-
ns (see available folder), whether the student is at the University, at home,
elsewhere. The fee charged at each official registration period will be the
yment required for full coverage for a 6-month period and must be paid in
ll at the time of subscription.
The policy contract is between the individual and the insurance carrier and
accepted at any hospital or emergency room that accepts this type of medi-
l coverage. Details of the policy are contained in a folder available at the
udent Health Service Office.

NIVERSITY COUNSELING CENTER

irector E.L. Phillips

he George Washington University Counseling Center provides services de-
gned to assist students with educational, social, and personal problems. These

services help the individual to evaluate his educational, personal, and life.

Services of the Center include behavior therapy; individual and group seling; diagnosis of academic difficulties; the provision of remedial me such as study habits instruction (individual and group), programmed in tion, and the referral of students seeking help to qualified outside agencie

The Counseling Center also provides special assessment services in coo tion with the School of Engineering and Applied Science, the Office o missions, and other educational institutions.

Fees.—For students who are currently registered as degree candidates University, the fee is $20; for students currently enrolled in the Universit not as degree candidates, $60; for graduates of the University, $60; for munity clients, $85. Fees for specialized testing are dependent upon the ices involved. All fees are payable at the Counseling Center Office.

INTERNATIONAL STUDENTS

Adviser W.A.R. Walker

International House is the campus center for students from foreign cou It serves also as the headquarters of the International Students' Society, seeks to promote international friendship and understanding by welcomi its membership students from all countries, including those from the U States.

The Adviser to International Students has his Office in International H and is available each day throughout the school week for consultation o migration regulations and on any matters concerning the social and aca welfare of the foreign student.

STUDENT AND ALUMNI CAREER SERVICES OFFICE

Career Services Officer Gertrude McSurely

The Student and Alumni Career Services Office provides assistance to d seeking students and alumni seeking full-time, part-time, temporary, or p nent employment.

The Office maintains a registry of positions available in many fields locally and nationally, and refers qualified applicants for consideration. Office administers the On-campus Industrial and Government Recru Interview Program for seniors and graduate students, in which private panies, government agencies, service organizations, public school systems universities participate. The Office also handles the referral and plac functions of the on-campus College Work-Study Program. Prospective ers may establish permanent credentials files in the Student and Alumni C Services Office. This service includes files for alumni seeking college university faculty and administrative positions. The Office also provide dividual interviews for students and alumni wishing career guidance.

RELIGIOUS LIFE

The University recognizes the contribution that religion makes to the life students and encourages them to participate in the various religious org tions of their own choice. Catholic, Jewish, and Protestant bodies sp

rious groups and form a link between the University and the religious community. The advisers of the religious organizations are available for counseling.

Religious services in various traditions are provided regularly for the University community as announced.

STUDENT ACTIVITIES

Activities Coordinator John Perkins

he offices of the Vice President for Student Affairs, the Dean of Students, nd the Director of the Cloyd Heck Marvin Center are responsible for all co-rricular phases of student life, such as student activities and social life.

TUDENT ACTIVITIES OFFICE

he Student Activities Office, located on the fourth floor of the Cloyd Heck larvin Center, is a service of the division of Student Affairs. It seeks to facilite all phases of student activity; to maximize the opportunities for direct inolvement of students in co-curricular experiences, and to locate and utilize ommunity and University resources for programs of mutual benefit to students nd the community. The staff assists student organizations in leadership traing, programming, and community service projects. The Office also serves as n information center for publicizing the University master activities calendar, or registering and cataloguing campus organizations, for scheduling events nd facilities, and for aiding communication between campus organizations. tudents interested in participating in any phase of University life, including ocial, cultural, community, or academic programming, should acquaint themelves with the staff, services, and functions of the Office.

TUDENT GOVERNMENT

he University believes in encouraging the development of responsibility and eadership in students by providing various avenues of expression within its overnmental structure. Whether in residence hall governments, faculty-udent policy committees, school councils, or Center boards, the opportunity or student participation in University decision-making and policy implementaon is both substantial and varied. Student government, with the advice and ounsel of offices of the division of Student Affairs, reinforces the educative rocess through practical living experience.

Joint Committee of Faculty and Students.—This Committee is officially harged with facilitating all efforts to improve student-faculty relations, with ncouraging student recommendations in all areas of Faculty Senate policy ormulation which affect student life, and with recommending changes in the ules and regulations governing the conduct of student life. The Committee as specific advisory powers in any area concerning student-faculty relations r the interests of the student body.

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he control and administration of all student activities are outlined in *The Stulent Handbook*.

SPORTS

The University is a member of the National Collegiate Athletic Associ
Its teams participate in intercollegiate contests in basketball, baseball, t
golf, rifle, soccer, wrestling, and crew.

The University offers a broad program of extramural sports activitie
both men and women through the Department of Physical Education.

MAJOR PROGRAM EVENTS

Recreation Program.—The Center Program Board and the Departme
Physical Education arrange dances, movies, and trips at frequent interva
all students.

Pop Concert Program.—The Center Program Board sponsors concerts
semester at which nationally known entertainers perform.

Orchestra Series.—The University Orchestra offers a series of con
throughout the academic year.

University Concert Series.—The Department of Music offers a series of
certs throughout the academic year.

Art Exhibits.—The work of locally, nationally, and internationally k
artists is shown in monthly exhibits in the Dimock Gallery in Lisner Lo
and the art gallery of the Cloyd Heck Marvin Center. With the cooperatio
the Curator of Art, an annual student art exhibit is presented.

Winter Weekend.—Scheduled in the latter part of the fall semester, W
Weekend includes Homecoming activities, theater productions, a carnival,
athletic events.

Religion-in-Life Program.—Special emphasis is given to the place of rel
in contemporary society in this program of events during the fall and s
semesters.

STUDENT ORGANIZATIONS

The following is a partial list of student organizations at the University.
complete information on these and other organizations is available at the
dent Activities Office.

FORENSICS AND PERFORMING ARTS

Enosinian Debating Society; George Washington University Dance Comp
Station WRGW; University Chamber Choir, Chorus, Orchestra; Univ
Players. A variety of programs is presented by these groups throughou
academic year.

HONOR SOCIETIES

Phi Beta Kappa.—A national honor society recognizing "outstanding
lectual capacity well employed" in the field of liberal arts and sciences. S
and junior students who are candidates for the degree of Bachelor of Ar
Bachelor of Science in Columbian College and who have shown broad cu
interests, distinguished scholarly achievement, high character, general pro
and scholarly ideals may, to a number not exceeding 15 per cent of a clas
elected to membership by the Faculty members of the Alpha Chapter o

istrict of Columbia. Seniors and juniors in other schools of the University o meet the above requirements are also eligible for consideration for membership, provided that their program of studies includes appreciable work in liberal arts.

Sigma Xi.—A national scientific honor society, the purpose of which is to courage original investigation in science, pure and applied. Outstanding duate students in the sciences are eligible for full membership, and undergraduates who have shown marked ability in research may be elected to associate membership.

Delphi.—An intersorority honorary society.
Delta Sigma Rho-Tau Kappa Alpha.—A national forensic society.
Dobro Slovo.—National Slavic languages honor society.
Iota Sigma Pi.—A national chemical society for women.
Mortar Board.—A national society for senior college women, stressing leadership, scholarship, and service.
Omicron Delta Epsilon.—A national economics society.
Omicron Delta Kappa.—A national fraternity emphasizing leadership in extracurricular activities.
Order of Scarlet.—A service honorary society for sophomore and junior men.
Phi Eta Sigma.—A national fraternity, established to encourage and reward gh scholarship and attainment, membership in which is limited to those freshan men who attain a scholarship average of at least 3.50 or equivalent.
Phi Sigma Tau.—A national philosophy honor society.
Pi Mu Epsilon.—A national mathematics honor society.
Psi Chi.—A national psychology fraternity.
Sigma Alpha Eta.—A national speech and hearing fraternity.
Sigma Delta Pi.—A national Spanish honor society.

ROFESSIONAL ORGANIZATIONS

lpha Chi Sigma (chemistry), Alpha Kappa Psi (commerce and economics), elta Nu Alpha (national professional transportation fraternity), International Association of Students in Business and Economics, Personnel Society, hi Delta Gamma (graduate), Phi Delta Kappa (education), Pi Lambda Theta education), Sigma Delta Chi (journalism), Student Health Care Organization.

OCIAL FRATERNITIES

elta Tau Delta, Kappa Sigma, Phi Sigma Delta, Sigma Alpha Epsilon, Sigma lpha Mu, Sigma Chi, Sigma Nu, Sigma Phi Epsilon, Tau Kappa Epsilon.

OCIAL SORORITIES

elta Gamma, Delta Phi Epsilon, Kappa Alpha Theta, Kappa Kappa Gamma, hi Sigma Sigma.

EPARTMENTAL CLUBS

American Civilization Undergraduate Majors, Anthropology Club, Geology Club, German Club, Russian Club.

RELIGIOUS ORGANIZATIONS

Baptist Student Union, B'nai B'rith Hillel Foundation, Christian Scien
ganization, Eastern Orthodox Club, Lutheran Student Association, Ne
Foundation, Religious Society of Friends, Unitarian-Universalist Club,
Christian Fellowship, Wesley Foundation.

STUDENT PUBLICATIONS

Academic Forum (student-faculty journal), *The Cherry Tree* (the yearb
The University Hatchet (semi-weekly newspaper), *Journal of Internationa*
Comparative Studies (publication of Consortium graduate students), *The*
Creek (literary magazine), *Student Directory*.



COLUMBIAN COLLEGE OF ARTS AND SCIENCES

Dean C.D. Linton
Assistant Deans Barbara Dunham, J.L. Métivier, Jr., R.C. Rutledge, H.E. Yeide, Jr.

FACULTY*

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* The President of the University, the Vice President for Academic Affairs, the Registrar of the University, the Director of Admissions of the University, and the Director of Libraries of the University are ex officio members of the Faculty of Columbian College of Arts and Sciences.

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Associate Professors Eugene Abravanel, Caroline Adams, Ruth Bari, Bette ton, Lee Bielski, L.S. Bowling, Sr., A.D. Britt, Letitia Brown, E.A. Car A.E. Claeyssens, Jr., A.G. Coates, Mary Ann Coffland, G.F. Conner, Courtless, Jr., Linda DePauw, R.M. Dunn, Jr., C.F. Elliott, Roland Fleisc M.G. Gallagher, Lyndale George, I.I. Glick, Marvin Gordon, M.D. Gre W.B. Griffith, F.S. Grubar, S.E. Haber, Dagmar Henney, C.J. Herber, Hill, J.W. Hillis, Mary Holman, Ching-Yao Hsieh, R.L. Humphrey, Jr., Ireland, S.G. James, Eva Johnson, W.R. Johnson, S.A. Karp, Irving K R.W. Kenny, Young Kim, Virginia Kirkbride, F.C. Kurtz, Myrna Lee, Lewis, R.K. Lewis, C.A. Linden, R.C. Lindholm, W.F.E. Long, W.L. Mar Muriel McClanahan, F.L. Minn, J.A. Morgan, Jr., C.A. Moser, Nad Natov-Popluiko, G.A. Olkhovsky, Chei-Min Paik, Kittie Parker, Rob Parris, C.H. Pfuntner, Bernard Reich, W.M. Reynolds, Charles Rice, Ph Robbins, W.W. Rowe, R.C. Rutledge, Pilar Sáenz, S.O. Schiff, Lois Schwoe R.H. Shumway, D.E. Silber, W.A. Smith, Jeanne Snodgrass, Carl Ste R.H. Tanck *(Research)*, D.H. Teller, Klaus Thoenelt, Richard Thorn N.A. Tilkens, W.L. Turner, C.E. Tuthill, J.D. Vedvik, Dewey Wallace, R.C. Willson, Maida Withers, Elizabeth Wright, H.E. Yeide, Jr., R.Y.C.

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* The Dean of Columbian College of Arts and Sciences is an ex officio member of all committees.
† Elected by the Faculty.

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Ira Rockwood Telford, *Professor of Anatomy*
Louis B. Wright, formerly *Director, Folger Shakespeare Library*

INTRODUCTION

Since its founding in 1821, Columbian College of Arts and Sciences, the lib
arts college of the University, has continued to expand and develop with
city of Washington. Its central situation makes participation in the life of
Nation's Capital convenient for resident students. The cosmopolitan nature
the student body reflects the atmosphere of a great world capital. Because
students come from the fifty states and from ninety foreign countries, class
cussions and casual student conversations are enriched by a challenging va
ety of viewpoints.

Columbian College offers programs leading to the degrees of Bachelor
Arts, Bachelor of Science, and Bachelor of Science in Medical Technolo
prelegal and premedical programs; the first two years of the professorial pr
grams in Education, in Government and Business Administration, and in Pu
lic and International Affairs.

All entering freshmen and transfer students of less than junior class stan
ing, except those in the fields of engineering and applied science, enter

* This Council serves both Columbian College of Arts and Sciences and the Graduate School
Arts and Sciences. The President of the University, the Vice President for Academic Affairs
Dean of Columbian College of Arts and Sciences, and the Dean of the Graduate School of
and Sciences are ex officio members of the Council

ower division of Columbian College. The division is primarily concerned with roviding (1) the academic guidance needed in selecting and preparing for a najor field and (2) the broad cultural foundations in language and literature, cience, and social studies on which major-field specialization in the upper livision is built.

During the junior and senior years the student is in the upper division, where ie is guided by his major adviser. A student who plans to continue toward a Master's degree should plan his Bachelor's program so that it will prepare him or the graduate work of his interest.

Columbian College has degree-granting authority over the off-campus programs eading to the degrees of Bachelor of General Studies (areas of concentration n history, mathematics, political science, and psychology), Bachelor of Science n Environmental Health, Bachelor of Science in Geodetic and Cartographic Science, and Bachelor of Science in Oceanography.

These off-campus degree programs are administered by the College of Gen-ral Studies. For further information see the *College of General Studies* cata-ogue.

THE COLUMBIAN COLLEGE PROGRAM

The Columbian College program is a contemporary application of the historic iberal arts tradition. Its purpose is to enable the student to develop both his articular abilities and his general awareness as a human being. It demands of he student a thorough acquaintance with one major area of learning and at he same time an understanding of how that specialization fits into the larger ontext of the scientific, social, and moral problems which confront modern ian. It stresses not merely expertness but that broadly enlightened expertness vhich encourages its graduates to grow through the years in ability and wisdom.

OPHOMORE YEAR IN PARIS PROGRAM

Freshmen who have received grades of Pass or higher in all course work dur-ng the first semester may be eligible to participate in the George Washington Jniversity-American College in Paris Sophomore Year in Paris Program. Qualified students will be encouraged to accept this opportunity to profit from he cultural and intellectual riches of Europe by spending their second year ving and studying in Paris. Credits earned in this Program will be transfer-ible toward a degree in Columbian College of Arts and Sciences. Since all ourses are taught in English, a knowledge of French is not mandatory, but is esirable. Students with no training in the French language will be required to articipate in an intensive five-week language program in Paris prior to the eginning of the academic year.

ENTRANCE REQUIREMENTS

Good character and an academic background appropriate for the program of tudies contemplated are required.

LOWER DIVISION

Requirements for admission to the freshman class are as follows:

1. An acceptable certificate of graduation from an accredited second school, showing at least fifteen units* which must include four years of Engl at least two years of one foreign language; two years of science, prefera with laboratory instruction; two years of social studies, one of which must American history; and two years of college preparatory mathematics. One u of algebra, or the equivalent, is prerequisite to courses in chemistry and tistics; and one unit in algebra and one unit in plane geometry, or the equi lent, are prerequisite to courses in mathematics and physics.

2. The principal's statement that the applicant is prepared to undertake c lege work.

3. College Entrance Examination Board scores must be submitted on t Scholastic Aptitude Test and the English Composition Achievement Test.

It is recommended that the examinations be taken in December or Januar Scores on tests taken in the junior year may be submitted. Arrangements f tests are the responsibility of the applicant and should be made with the Ed cational Testing Service, 20 Nassau Street, Princeton, N.J. 08540; or 194 Center Street, Berkeley, Calif. 94704, not less than one month before the da of the test. In applying for the test, the applicant should specify that the scor be sent to the Office of Admissions, George Washington University, Washin ton, D.C. 20006.

The Committee on Admission and Advanced Standing will consider the ad quacy of the qualifications of an applicant who, because of unusual circum stances, does not present all of the formal requirements stated above. T Committee may prescribe appropriate scholastic-aptitude tests of the University.

UPPER DIVISION

The following are requirements for admission to degree candidacy in the upp division:

Bachelor of Arts.—Sixty-four hours of satisfactory academic work based o the *Arts and Letters* curriculum in the lower division, or the equivalent, ar required.

Bachelor of Science.—Sixty-four hours of satisfactory academic work base on the *Science* curriculum in the lower division, or the equivalent, are required

Bachelor of Science in Medical Technology.—Sixty-four hours of satisfactor academic work, including B Sc 11–12; Chem 11–12, 22, and 50, are required.

REGULATIONS

Regulations regarding ADMISSION, REGISTRATION, FEES AND FINANCES *are stated on pages 23–33; other University regulations, on pages 44–52.*

ACADEMIC WORK LOAD

A full-time student not on probation may take ordinarily not more than 1 semester hours. A student employed more than 20 hours a week who is no on probation may take not more than 10 hours.

* A unit represents a year's study in a secondary school subject, including in the aggregate no less than 120 sixty-minute periods, or the equivalent, of prepared classroom work.

The amount of work taken by a student on probation is limited by the Committee on Scholarship.

A full-time student who, during the immediately preceding semester, has received no grades below High Pass and has earned Honors grades in three courses totaling at least 9 semester hours may take 18 or 19 hours. An employed student who, during the immediately preceding semester, has received no grades below High Pass and has earned Honors grades in two courses totaling at least 6 semester hours may take not more than 12 hours.

A student who accepts employment after registration or at any time during a semester must report that fact immediately to the Dean so that his program may be adjusted, if necessary.

ATTENDANCE

The student is held responsible for all the work of the course in which he is registered, and all absences must be excused by the instructor in charge before provision is made for the student to make up work missed.

USE OF CORRECT ENGLISH

The use of correct English, oral and written, is required in all courses. Any student whose English in any course whatever is deemed unsatisfactory may be reported by the instructor to the Dean and to the Committee on the Use of Correct English. The Chairman of the Committee may assign supplementary work, without academic credit, varying in amount with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition fee is charged. The granting of a degree may be delayed by failure to make up any such deficiency in English to the satisfaction of the Committee and the Dean.

HONORS

Lower Division Honors Program.—Columbian College offers an honors program for selected sophomores. The program is designed to provide an appropriate challenge and opportunity for gifted students; to permit early identification of students with the highest potential for high-quality graduate work and success in competitive award programs; to introduce educational innovations which may possibly be applied at a later date to the student body at large; to bring together a group of students whose activities will enable them to contribute more significantly to academic discussion within the University as a whole; and to involve superior students in a program unmistakably identified with the liberal arts ideal of the generally educated man, thus balancing the emphasis on concentrated study that is the heart of existing departmental honors programs.

The program normally consists of 2 honors seminars (see page 307), each limited to approximately 15 students. Each seminar carries 3 semester hours of credit, and represents elective hours in the student's program. Directors of the seminars invite expert faculty members from different fields to assist in discussion of particular problems. Students may elect a program of independent study in place of the second seminar.

Participants in the Honors Program are selected at the end of their first ye on the basis of an application to the program. All students who earn 4 grad of High Pass or better in their first semester are automatically eligible to appl Other students doing high-quality work may apply on the recommendation two of their instructors.

A student will have the designation "honors in the lower division" entere into his permanent record if he (1) completes successfully 2 semesters honors work and (2) earns grades of High Pass or better in 16 courses durin his first two years of study.

Dean's List.—The name of every student who takes a minimum of 15 semes ter hours in any one semester, who receives grades of Honors in at least 60 pe cent of the course work taken in that semester, and who has no grades of Fa for that semester, is placed on the Dean's List for that semester.

ACADEMIC STANDING

A student who is not suspended or on probation is considered to be in good standing.

The following rules governing probation and suspension are applicable as stated to students enrolled for a full-time program (12 semester hours or more during the fall or spring semester. Students enrolled for less than 12 semester hours during the fall or spring semester and students enrolled during the summer sessions are subject to probation or suspension on the basis of their record for four courses (3 or more semester hours of credit each), or multiples thereof rather than on their record in any one semester.

PROBATION

A student who in one semester receives two grades of Fail in courses carrying 3 or more semester hours of credit each, or the equivalent, is placed on probation. A student in his first semester on probation who receives one grade of Fail in such a course will be continued on probation for a second semester. A student on probation taking 12 or more semester hours whose grades are all Pass or better is removed from probation.

SUSPENSION

A student who in one semester receives grades of Fail in three courses carrying 3 or more semester hours of credit each, or the equivalent, is suspended. A student in his first semester on probation who receives two or more grades of Fail in such courses is suspended. A student who receives one or more grades of Fail in such courses in any later semester on probation is suspended.

The minimum period of academic suspension is one fall or one spring semester. Final dates for applying for readmission are the same as those governing "Undergraduate Admission" (see pages 22–24). A suspended student seeking readmission must submit evidence to the Committee on Admission and Advanced Standing that during his absence from the University he has conducted himself as to indicate that he will profit by readmission. A student suspended twice for poor scholarship will not be readmitted.

MID-SEMESTER WARNING

At the end of the sixth week of each semester, instructors file in the Office of the Dean the names of freshman and sophomore students who are doing unsatisfactory work. A notice of Warning is sent to the student and a copy filed with the appropriate adviser. A "Warning" constitutes notice to the student that he must consult his instructor and adviser at the earliest opportunity.

CORRESPONDENCE AND HOME-STUDY COURSES

No credit is given for work done by correspondence or in home-study courses.

CLASSIFICATION OF STUDENTS

A *freshman* is a student who is in the process of completing 32 semester hours, including 18 hours of his curriculum requirements.

A *sophomore* is a student who has completed between 32 and 64 semester hours, including 18 hours of his curriculum requirements.

A *junior* is a student who has completed between 64 and 94 semester hours and filed the declaration of his major, approved by his adviser, in the Office of the Dean.

A *senior* is a student who has completed between 94 and 124 semester hours, including at least 6 hours of second-group course work in his major.

An *unclassified student* is one who is not a candidate for a Bachelor's degree (normally because he already holds it), but who wishes for valid academic reasons to take a limited program for a limited time. Registration in this status is permitted only with the prior approval of the upper division Dean's Council.

The Lower Division

A STUDENT IN THE LOWER DIVISION is given the opportunity of taking a wide range of liberal arts subjects—humanities, foreign languages, sciences, social studies—both as a means of laying the groundwork for the more concentrated major-field study in the upper division and as a means of determining what academic area is best adapted to his interests and aptitudes. In order to insure that these general educational requirements are met, the student is not permitted to anticipate major-field special courses until all basic areas are covered.

ENTRANCE REQUIREMENTS

Entrance requirements of the lower division are stated on pages 69–70.

ADVISORY SYSTEM

Each student in the lower division is provided with two kinds of counseling. *Academic* advising is performed by members of the Faculty selected for their knowledge of freshman-sophomore requirements and programs, and each student makes up his program in consultation with the adviser assigned to him before registration. *Personal* counseling is available through the Office of the Dean

of Students. All students are encouraged to maintain close contact wi
Faculty advisers.

Students who intend to transfer after the sophomore year to the Sch
Education, the School of Government and Business Administration,
School of Public and International Affairs are assigned special advisers t
them in planning their programs.

An academic warning system permits early attention to students whose
falls below required standards. In such cases, students are required to c
regularly with their advisers. On request, copies of academic warnings o
bation notices may be sent to parents or guardians, who are themselve
come to meet with members of the advisory staff.

REQUIRED PLACEMENT EXAMINATIONS

English.—Students whose College Board English Composition Achieve
Test scores suggest inadequate preparation may be assigned to Engl 1
may be tested in vocabulary, spelling, grammar, standard usage, and w
skill before placement in either Engl 1x or 1. Students whose scores ind
marked superiority will be allowed to waive the Engl 1 requirement.

Foreign Languages.—A standardized placement examination is require
all entering students who wish to continue in college the language begu
high school (Chinese, French, German, Greek, Hebrew, Italian, Latin, Rus
or Spanish). Upon completion of the examination, assignment is made to
appropriate course.

Mathematics.—New students registering for Math 30 are required, prio
registration, to take a placement examination in algebra and trigonometry.

FIRST- AND SECOND-GROUP COURSES

A freshman or sophomore may take second-group courses (courses numbe
101–200) only with the written permission of the Department and of t
Dean. A student is not permitted to postpone a required first-group course
take a second-group course for elective credit. The policy that first-gro
courses must be taken in the freshman and sophomore years, and advanc
courses in the junior and senior years, is followed in approving student p
grams.

PROFESSIONAL COURSES

Except for majors in Applied Mathematics and for students intending to app
for the combined degrees of Bachelor of Arts and Doctor of Medicine or t
degree of Bachelor of Science in Medical Technology, no more than 12 hou
of professional courses, i.e., courses offered in units of the University oth
than Columbian College, may be included in the 124 hours required for th
Bachelor's degrees in Columbian College. Students electing professional cours
under this rule must obtain the approval of the Dean before registration.

PHYSICAL EDUCATION REQUIREMENT

Freshmen and sophomores are required to take four semesters of physical edu
cation (PE 4, 5, or 6) unless they are registered for less than 9 semester hou
or unless regular employment during the day makes it necessary to take
classes during the evening hours.

Any other exemptions will be granted only upon written petition which has been recommended by the University Physician and approved by the Dean. Students exempt from the physical education requirement must substitute four semester hours of electives.

The required medical and physical examinations, as specified by the Department of Physical Education, will be arranged at the beginning of each semester for those students who lack reports.

FOREIGN LANGUAGE REQUIREMENT

In curricula requiring foreign languages a student must complete satisfactorily the equivalent of two years of college work in a single foreign language. (Chinese*, French, German, Hebrew, Greek†, Italian, Latin†, Russian, Spanish.)

A student offering for admission four acceptable high school units of a single foreign language, or the equivalent, is not required to take any foreign language.

A student who offers less than four units and wishes to meet the requirement by continuing in the same language must take the language placement test.

In general, one year of high school language is considered equivalent to one semester of college language.

In some instances foreign languages are required or recommended as preparation for advanced work. The student should consult his adviser so that appropriate foreign languages may be included, when necessary, in his lower division program.

ENGLISH REQUIREMENT

Entering students registered in the arts and sciences curricula must follow the sequence of Engl 1 or 1x, both halves of one of the introductory literature courses, and Engl 40. This does not apply to students transferring to these curricula or students registering in the preprofessional curricula.

EXAMINATIONS FOR WAIVING CURRICULUM REQUIREMENTS‡

A required course may be waived and admission to an advanced course granted by the passing of a waiver examination. Passing this examination does not entitle the student to any hours of credit. Written request to take the examination should be made to the Dean and the required fee paid at the Office of the Cashier before taking the examination.

TRANSFER FROM LOWER DIVISION TO UPPER DIVISION

On satisfactory completion of a lower division curriculum of 64 or more semester hours, the student is transferred to the upper division.

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* Asia 5–6 is required of Chinese Studies majors.
† Greek and Latin not acceptable for International Affairs and Public Affairs majors.
‡ This provision does not apply to the premedical student, all of whose required premedical work must be taken in a recognized college of arts and sciences.

LOWER DIVISION CURRICULA

Each of the following curricula comprises the first two years of a standard fo year college course.

All curricula in this group may be applied toward the degree of Associa in Arts. Students wishing to receive this degree must apply at the Registra Office at the time of registration for the fourth or last semester. The last semester hours must be spent in residence in Columbian College.

IN PREPARATION FOR THE UPPER DIVISION OF COLUMBIAN COLLEGE

Arts and Letters

First two years of the Bachelor of Arts curriculum:

		Semester Hours
Comp & Lit:	Engl 1 or 1x; Clas 71 and 72, Engl 51–52, 71–72, or 91–92, Fren 51–52, Germ 51–52, Ital 51–52, Slav 91–92, or Span 51–52; and Engl 40	12
*Language:		12
†PE:		4
Science:	B Sc 3–4 (nonscience majors) or 11–12 (science majors); Chem 3–4 (nonscience majors) or 11–12 (science majors); Geol 1–2; or Phys 1 and 2, or 9–10 (nonscience majors)	6–8
Social Studies:	AmCv 71–72, Anth 1–2, Econ 1–2, Geog 51 and 52, Hist 39–40 or 71–72, P Sc 5–6, or Soc 1–2	6
‡Elective:		22–24
	Total	64

Science

First two years of the Bachelor of Science curriculum:

		Semester Hours
Comp & Lit:	Engl 1 or 1x; Clas 71 and 72, Engl 51–52, 71–72, or 91–92, Fren 51–52, Germ 51–52, Ital 51–52, Slav 91–92, or Span 51–52; and Engl 40	12
Language:	French, German, Russian, or nonscience elective	12
	NOTE.—A reading knowledge of French, German, or Russian is required. This may be satisfied by Fren 4 or 6, Germ 4, or Slav 4 or 6, or by special examination.	

* See page 75 for foreign language requirement
† See pages 74–75 for physical education requirement
‡ It is suggested that electives include one of the following courses: Art 31–32, 71–72; Mus 3, 4, Phil 61–62; Rel 9, 10, 21, 59–60.
The student should obtain the advice of his major department as to proper prerequisite and collateral courses for the intended major
Credit may be given for a limited number of courses elected in Physical Education, with the approval of the Dean

		Semester Hours
Math:	Math 3, 6, or electives	6
	NOTE.—The Math 3 requirement may be satisfied by offering two years of high school algebra acceptable for admission; the Math 6 requirement may be satisfied by offering one-half year of high school trigonometry acceptable for admission.	
*PE:		4
Science:	B Sc 11–12	8
	Two additional full-year courses are required, to be chosen from Chem 11–12, Geol 1–2, and Phys 1 and 2	14–16
Social Studies:	AmCv 71–72, Anth 1–2, Econ 1–2, Geog 51 and 52, Hist 39–40 or 71–72, P Sc 5–6, or Soc 1–2	6
†Elective:		0–2
	Total	64

Premedical

Premedical students may follow either the Arts and Letters or the Science curriculum above in fulfilling the first 64 semester hours of the premedical requirement. Each premedical program must be approved by the premedical adviser. For admission to most medical schools, a minimum of 90‡ semester hours applicable toward a degree in an approved college of arts and sciences must include the following:

1. **Biology**: 8 semester hours. This may be either in general biology or zoology but may *not* include separately credited courses in botany.
2. **Chemistry**: 8 semester hours of general inorganic chemistry (which may include qualitative analysis), including 4 semester hours of laboratory; and 6 to 8 semester hours of organic chemistry, including laboratory.
3. **Physics**: 8 semester hours, including at least 2 semester hours of laboratory.
4. **English**: 6 semester hours in composition and literature. This may be the usual introductory college course or its equivalent.

While not required for admission, courses in embryology, histology, genetics, and mathematics are strongly recommended.

With the exception of these specific requirements applicants are urged to follow their personal interests in developing their premedical courses of study. A well-balanced program, rather than a specific field, is the criterion by which an applicant is judged. It is not advisable to take courses that appear to cover subject matter in the medical program.

While well-qualified candidates are eligible for admission after completing the minimum 90 semester-hour requirement, the majority of applicants are found to be better prepared for the study of medicine after four years of college work.

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* See pages 74–75 for physical education requirement

† It is suggested that electives include one of the following courses: Art 31–32, 71–72; Mus 3, 4; Phil 61–62; Rel 9, 10, 21, 59–60.

The student should obtain the advice of his major department as to proper prerequisite and collateral courses for the intended major.

Credit may be given for a limited number of courses elected in Physical Education, with the approval of the Dean.

‡ The 4 semester hours of physical education required at George Washington University are not applicable toward admission to Medical School

Medical Technology

First two years of the Bachelor of Science in Medical Technology curriculum
See page 85 for a description of the program and the requirements for th
junior and senior years:

		Semester Hours
Comp & Lit:	Engl 1 or 1x; Clas 71 and 72, Engl 51–52, 71–72, or 91–92, Fren 51–52, Germ 51–52, Ital 51–52, Slav 91–92, or Span 51–52; and Engl 40	12
Language:	French, German, Russian, or nonscience elective	12
	NOTE.—A reading knowledge of French, German, or Russian is required. This may be satisfied by Fren 4 or 6, Germ 4, or Slav 4 or 6, or by special examination.	
Math:	Math 3, 6, or electives	6
	NOTE.—The Math 3 requirement may be satisfied by offering two years of high school algebra acceptable for admission; the Math 6 requirement may be satisfied by offering one-half year of high school trigonometry acceptable for admission.	
*PE:		4
Science:	B Sc 11–12	8
	Chem 11–12, 22, 50	16
Social Studies:	AmCv 71–72, Anth 1–2, Econ 1–2, Geog 51 and 52, Hist 39–40 or 71–72, P Sc 5–6, or Soc 1–2	6
†Elective:	May be selected in lieu of the various exemptions	
	Total	64

IN PREPARATION FOR THE SCHOOL OF EDUCATION

Education

First two years of the Bachelor of Arts in Education curriculum:

		Semester Hours
Engl:	Composition—Engl 1 or 1x, 2	6
	Literature—Engl 51–52, 71–72, or 91–92	6
Language:	Chinese, French, German, Italian, Latin, Russian, or Spanish. See page 75 for foreign language requirement	12
Math:	Two semesters to supplement senior high school courses, chosen from Math 3, 6, 9, 10	6
*PE:		4
Psyc:	Psyc 1, 22	6
Science:	Three semesters (2 in biological science and one in physical science or vice versa) to supplement senior high school courses in those fields, chosen from B Sc 3–4 or 11–12; Chem 3–4 or 11–12; Geol 1–2; or Phys 1 and 2, or 9–10. A Secondary Education Major offering for admission 2 or more acceptable senior high school units in the above areas of science may be exempted from one semester of this requirement	9–12

* See pages 74–75 for physical education requirement
† It is suggested that electives include one of the following courses: Art 31–32, 71–72; Mus 3, 4, Phil 61–62; Rel 9, 10, 21, 59–60.
Credit is not given for courses in Physical Education

		Semester Hours
Social Studies:	Hist 71–72 or P Sc 5–6	6
	AmCv 71–72, Anth 1–2, Econ 1–2, Geog 51 and 52, Hist 39–40 or 71–72, P Sc 5–6, or Soc 1–2	6
Sp&D:	Sp&D 1 (or 11, if the Department so advises)	3
Elective:	May be selected in lieu of the various exemptions.	
	Total	64–67

Physical Education

First two years of the Bachelor of Science in Physical Education curriculum:

		Semester Hours
Engl:	Engl 1 or 1x, 2	6
*Language:	Chinese, French, German, Italian, Latin, Russian, or Spanish. See page 75 for foreign language requirement	12
†PE:		4
Psyc:	Psyc 1, 22	6
Science:	B Sc 3–4; Chem 3–4; Geol 1–2; or Phys 1 and 2, or 9–10	6–8
Social Studies:	Two full-year courses selected from the following: AmCv 71–72, Anth 1–2, Hist 39–40 or 71–72; P Sc 5–6, or Soc 1–2	12
Sp&D:	Sp&D 1 (or Sp&D 11, if recommended by the Department)	3
Elective:		15
	Total	64–66

IN PREPARATION FOR THE SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION

Accounting, Business Administration, and International Business

First two years of the Bachelor of Business Administration curricula in Accounting, Business Administration, and International Business:

		Semester Hours
Acct:	Acct 1–2	6
B Ad:	B Ad 51	3
Comp:	Engl 1 or 1x, 2	6
Lang, Lit, Art, Music, or Speech:	Art 31–32 or 71–72; Asia 3–4; Engl 51–52, 71–72, or 91–92; Fren 3–4 or 6, or 51–52; Germ 3–4 or 51–52; Ital 3–4 or 51–52; Mus 3 and 4; Slav 3–4, 5–6, or 91–92; Span 3–4 or 6, or 51–52; or Sp&D 1 and 11	6
Math:	Math 30, 31	6
†PE:		4
Science:	B Sc 3–4 or 11–12; Chem 3–4 or 11–12; Geol 1–2; or Phys 1 and 2, or 9–10	6–8

* Mathematics, science, or other courses, approved by the adviser, may be substituted for the language requirement.
† See pages 74 75 for physical education requirement

		Semester Hours
Social Studies:	Econ 1–2	6
	Psyc 1, 8	6
	Anth 1–2, Geog 51 and 52, Hist 71–72, P Sc 5–6, or Soc 1–2	6
Stat:	Stat 51	3
*Elective:	Courses other than Accounting, Business Administration, or Economics	4–6
	Total	64

IN PREPARATION FOR THE SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS

Chinese Studies and International Affairs

First two years of the Bachelor of Arts curriculum in Chinese Studies and International Affairs:

		Semester Hours
Engl:	Composition—Engl 1 or 1x, 2	6
†Language:	Literature—Engl 51–52 or 71–72	6
Geog:	Geog 52	12
‡Math, Science:	B Sc 3–4 or 11–12; Chem 3–4; Geol 1–2; Math 3 and 6; Phys 1 and 2, or 9–10; or Stat 51 and 52	3
§PE:		6–8
Social Studies:	Econ 1–2; Hist 40, 71–72; and P Sc 5–6	4
*Elective:		21
	Total	4–6
		64

Public Affairs

First two years of the Bachelor of Arts curriculum in Public Affairs:

		Semester Hours
Engl:	Engl 1 or 1x, 2	6
†Language:		12
Math, Science:	B Sc 3–4 or 11–12; Chem 3–4; Geol 1–2; Math 3 and 6; Phys 1 and 2, or 9–10; or Stat 51 and 52	6–8
§PE:		4
Social Studies:	Econ 1–2; Hist 39–40, 71–72; and P Sc 5–6	24
*Elective:		10–12
	Total	64

* Credit is not given for courses elected in Physical Education.
† See page 75 for foreign language requirement.
‡ This requirement may be satisfied by 6 hours of Mathematics, by 3 hours of Mathematics plus Stat 51, or by 6 to 8 hours of science.
§ See pages 74–75 for physical education requirement.

Upper Division

A STUDENT working toward a Bachelor's degree in the arts or sciences who has 64 or more acceptable semester hours, whether earned in this University or transferred from another institution, is registered in the upper division of Columbian College. (For transfer from lower division to upper division, see page 75.) It is assumed that he has met the requirements of the lower division *Arts and Letters* or *Science* curriculum. If he has not, he must begin to make up his deficiencies immediately upon admission and continue to carry courses to this end until all requirements are met.

THE BACHELOR'S DEGREES

Columbian College offers programs leading to the degrees of Bachelor of Arts, Bachelor of Science, and Bachelor of Science in Medical Technology.

In cooperation with the School of Medicine a seven-year curriculum leading to the combined degrees of Bachelor of Arts and Doctor of Medicine is offered.

REQUIREMENTS FOR THE DEGREES

RESIDENCE

A minimum of 30 semester hours, including at least 12 hours in the major field, must be completed in residence in the upper division of Columbian College. This requirement applies to students transferring within the University as well as to students transferring from other institutions. Summer work may be counted in residence, but in no case may the period of residence aggregate less than thirty weeks. Unless special permission is granted by the Dean to pursue work elsewhere, the work of the senior year must be completed in residence.

For the regulation governing students who are absent from the University for one semester or more, see "Continuous Registration," page 48.

CURRICULUM REQUIREMENTS

At least 60 semester hours beyond those of the appropriate lower division curriculum and the satisfactory completion of the major are required. Each program must be approved by the major adviser and by the Dean.

At least 24 of the last 60 hours must be taken in subjects not included in the major field or department. The student should consult his major adviser at each registration concerning his choice of electives.

Except for premedical students and majors in Applied Mathematics or Medical Technology, no more than 12 hours of professional courses (i.e., courses offered in units of the University other than Columbian College) may be included. The election of professional courses must be approved by the Dean's Council prior to registration. Ordinarily courses in Physical Education and technical courses in Education will not be approved toward a degree.

A change in degree candidacy (e.g., from Bachelor of Arts to Bachelor of Science) requires the permission of the Dean. The degree requirements effective at the time the change is approved must be met.

Each student must select and file with the Dean a choice of major upon entering the upper division. He may change the major only with the consent of the Dean and of the department or committee concerned, and must meet the requirements for the new major in effect at the time the change is approved.

First-group courses may be required as prerequisites to the major, but because of their introductory character they may not be counted as part of such programs. (See "Explanation of Course Numbers," pages 181–182.)

Students transferring from other institutions or from other schools, colleges, or divisions in this University, with major requirements wholly or substantially met, must complete satisfactorily at least 12 semester hours of approved work in the major field in the upper division of Columbian College. This work will count as part of the minimum residence requirement.

Examination for Waiving Curriculum Requirements.—A required course may be waived and admission to an advanced course granted by passing of a waiver examination. Passing this examination does not entitle the student to any hours of credit. Written request to take the examination should be made to the Dean and the required fee paid at the Office of the Cashier (see page 31) before taking the examination.

INDEPENDENT STUDY PLAN

A junior or senior of demonstrated capacity, with a special interest in the subject matter of a regularly listed course, may be permitted to undertake independent study *in residence* under the personal direction of the instructor, in accordance with the rules of the appropriate department and with the approval of the Dean. Credit under this plan is limited to the specific semester hours of credit designated for each course in the list of courses of instruction. It assumes frequent and regular conferences between student and instructor.

BACHELOR OF ARTS

The work of the junior and senior years, including a major in one of the following fields, must be approved by the major adviser and by the Dean.

American Civilization
American Literature
Anthropology
Applied Mathematics
Applied Statistics
Art History and Theory
Biology
Botany
Chemistry
Classical Archeology and Greek
Classical Humanities
Dramatic Art
Economics
English Literature
Fine Arts
French Language and Literature
Geography
Geology
Germanic Languages and Literatures
History
Journalism
Latin
Latin American Studies
Mathematical Statistics
Mathematics
Music:
  Applied Music
  Music History and Literature
  Music Theory
Philosophy
Physics
Political Science
Psychology
Religion
Russian Language and Literature
Sociology
Spanish American Literature
Spanish Language and Literature
Speech Communication
Speech Pathology and Audiology
Zoology

COMBINED DEGREES OF BACHELOR OF ARTS AND DOCTOR OF MEDICINE

A candidate for the combined degrees of Bachelor of Arts and Doctor of Medicine must (1) complete the Medical School entrance requirements; (2) fulfill the Arts and Letters curriculum of the lower division requirements (see page 76); (3) accumulate 94 semester hours in the liberal arts, including a minimum of 30 in the upper division of Columbian College; (4) obtain the approval of the Dean of Columbian College at the time of entering the School of Medicine; (5) obtain the recommendation of the Dean of the Medical Center at the completion of all prescribed courses in the first year of the School of Medicine, at which time the degree of Bachelor of Arts will be conferred (professional work taken at another institution will not satisfy the major requirement for the combined degrees); (6) maintain throughout the entire course the scholarship level required for graduation.

BACHELOR OF SCIENCE

The work of the junior and senior years, including a major in one of the following fields, must be approved by the major department and by the Dean.

Biological Sciences
Biology
Botany
Zoology

Physical Sciences
Applied Mathematics
Applied Statistics
Chemistry
Geology
Mathematical Statistics
Mathematics
Physics

THE UNDERGRADUATE MAJOR

There are two types of undergraduate majors: the Field-of-Study Major and the Departmental Major. Two majors, Latin American Studies and Classical Archeology and Greek, although interdepartmental in nature, are governed by the regulations of the Departmental Major.

Field-of-Study Major

Each Field-of-Study Major covers a carefully worked out field of coordinated study and is under the supervision of the appropriate department and the Columbian College Committee on Studies.

The Field-of-Study Major requires no specific program of courses, although the student is required to meet the over-all general requirements for the degree (at least 124 semester hours of satisfactory work). Ability to pass the Major Examination is assumed to be a convincing demonstration that the student possesses the breadth, depth, and quality of knowledge of his major usually defined in terms of semester hours, courses, and grades. A pamphlet on each field is obtainable from the departmental chairman. The prospective student should place himself under the direction of the appropriate adviser immediately upon completing lower division work and beginning his junior year.

The Field-of-Study Major places special emphasis on the intellectual development of the individual student. Programs in the same major may vary, depending upon the individual student's background, previous study, and apti-

tudes. The student is expected to consult his adviser frequently, and the special proseminar offered in some fields gives him further opportunity for individual advice and direction in pursuing a program especially adapted to his needs and abilities. A close student-adviser relationship is essential for the student's success under the Field-of-Study Major plan.

The following Field-of-Study Majors are offered: American Civilization, American Literature, English Literature, French Language and Literature, History, Philosophy, Religion, Russian Language and Literature, Spanish American Literature, Spanish Language and Literature.

PROSEMINAR IN THE MAJOR

A proseminar is offered in most fields to help the student acquire a coordinated knowledge of his field through reading, study, and laboratory exercises. It is a presentation of the content and methods of the major field as a whole through the organization and coordination of the knowledge obtained in the various formal courses in the major subject and of material not usually included in such courses. This course is not required, but, if it is elected, strict attendance is essential. Six semester hours, but no qualitative grade, may be assigned. When registered in this course, the student has the privilege of visiting, subject to the approval of the instructor, any other appropriate course offered in the College. (Regular attendance in a course, either for credit or as an auditor, requires registration and payment of tuition.) Proseminars are open only to the student who has been accepted as a candidate under that specific major.

THE MAJOR EXAMINATION

The Major Examination will normally be taken at the close of the senior year; a student on a limited schedule may take it no earlier than one calendar year before graduation. A student who fails to pass a Major Examination may, at the discretion of the Committee on Studies, be re-examined at a later regular major-examination period. The Committee on Studies has general supervision of the preparation, reading, and grading of Major Examinations. Major Examinations are held each semester on dates fixed by the department or departments concerned, but in no case later than December 22 for the fall semester, April 13 for the spring semester, and August 26 for the summer sessions.

Departmental Majors

Departmental Majors, unlike Field-of-Study Majors, are defined in terms of credit hours, required courses, and the attainment of High Pass or Honors grades in half of the second-group courses taken in the major field. The minimum specific requirements for Departmental Majors are listed below the staff of instruction of the department concerned. The Chairman of the Department, or designated departmental adviser, should be consulted at registration concerning the student's program of courses; and the entire program, including electives, must be approved by the Department. The student is also expected to consult the Chairman or adviser in all matters affecting his program of studies, such as changes, substitutions, or withdrawals, and especially concerning his progress in his courses. A close student-adviser relationship is desirable.

Departmental Majors are offered in the following: American Literature; Anthropology; Applied Mathematics; Applied Statistics; Art History and Theory; Biology; Botany; Chemistry; Classical Archeology and Greek (interdepartmental); Classical Humanities; Dramatic Art; Economics; English Literature; Fine Arts; Geography; Geology; Germanic Languages and Literatures; Journalism; Latin; Latin American Studies (interdepartmental); Mathematical Statistics; Mathematics; Music (Music History and Literature, Music Theory, Applied Music); Physics; Political Science; Psychology; Sociology; Speech Communication; Speech Pathology and Audiology; Zoology.

BACHELOR OF SCIENCE IN MEDICAL TECHNOLOGY

In cooperation with the University Hospital and the Department of Pathology of the School of Medicine, Columbian College offers work leading to the degree of Bachelor of Science in Medical Technology, the fourth year of which (12 calendar months) is spent at the University Hospital.

A candidate for the degree must complete the Medical Technology curriculum in the lower division of Columbian College. He must fulfill the Columbian College requirements for the degree, including 30 semester hours of residence (the junior year) in the upper division. In the junior year B Sc 111 *Introductory Microbiology* and 4 additional semester hours selected from second-group Zoology courses are required; it is recommended but not mandatory that the student select B Sc 104 *Comparative Vertebrate Anatomy*, B Sc 148 *Histology*, or B Sc 164 *Vertebrate Physiology*. All or most of the remaining courses in the junior year should be selected from nonscience courses, i.e., social studies, arts, etc. The candidate must complete the 12-month Medical Technology Course in the University Hospital (senior year), which constitutes the major.

Each candidate must make application to take the 12-month Medical Technology Course at the University Hospital; this should be done early in the junior year. While admission to the Columbian College degree program does not assure acceptance into the Medical Technology Course, George Washington University students are given preference.

A number of scholarships are provided by the University Hospital for the students enrolled in the fourth (senior) year of the degree program.

For further information concerning the Medical Technology program call 331-6386.





GRADUATE SCHOOL OF ARTS AND SCIENCES

Dean A.E. Burns
Associate Dean W.F.E. Long
Assistant Dean Darlene Roth

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HISTORY AND ORGANIZATION

The Graduate School of Arts and Sciences is responsible for advanced study and research leading to Master's degrees and the degree of Doctor of Philosophy in the arts and sciences. Graduate programs at George Washington University were first formally organized under a graduate School in 1905, following several decades of gradual growth in a number of departments. In 1930 the Graduate School was discontinued. Columbian College, the University's liberal arts college, then assumed responsibility for the Master of Arts and Master of Science degrees, and a newly created Graduate Council administered all Doctor of Philosophy programs. Professional schools took responsibility for advanced degrees in the professional fields.

In 1967 the Graduate Council and the Graduate Division of Columbian College were consolidated into a new Graduate School of Arts and Sciences. All graduate programs in the arts and sciences leading to the degrees of Master of Arts, Master of Fine Arts, Master of Music, Master of Science, Master of Science for Teachers, Master of Science in Forensic Science, and Doctor of Philosophy are under the Graduate School.

In addition, a Master of Philosophy degree is awarded by the School, upon recommendation of the appropriate department, to doctoral candidates who have successfully completed the General Examination for the Doctor of Philosophy degree and have begun to work on the dissertation.

The School is under the direction of the Graduate Faculty of Arts and Sciences. It is the responsibility of the Faculty to set the requirements for admission to the School, to provide courses and programs of study and research for its students, to establish academic standards for its degrees, to recommend to the Board of Trustees the awarding of degrees, to lay down regulations as needed for the operation of the School, and generally to supervise its activities.

The administration of the School is vested in the Dean, who is Chairman of the Dean's Council, which is responsible to the Faculty of the School for all policy matters.

ADMISSIONS REQUIREMENTS

Application forms for admission to graduate study are obtained from the Office of the Dean of the Graduate School of Arts and Sciences. When completed, these application forms must be submitted to this Office, together with college transcripts and letters of reference.

Applicants must have academic backgrounds of excellence, usually with majors, or equivalent, in the fields in which they intend to study for advanced degrees. Normally, a *B* average (or equivalent) from an accredited college is required. With evidence of special promise, such as high Graduate Record Examination scores, an applicant may be accepted whose academic record falls short of *B*. The minimum does not assure automatic acceptance. The departments may, and often do, set higher admissions standards. Moreover, the number of spaces available for new graduate students limits the number that can be accepted. Students who apply in their senior year must have completed their baccalaureate work before registration in the Graduate School and must present evidence of such completion.

Application for Admission.—Students applying for admission for the fall semester must file completed applications by February 15. The deadline for admission for the spring semester is November 1. Later application diminishes the prospects for admission.

Readmission.—A student who has failed to maintain continuous registration and wishes to resume his graduate program must file an application form to be considered for readmission. Readmission is not guaranteed, and the application is subject to review by the department concerned and the Dean. The student may be required to take qualifying examinations on the course work completed. Application forms are available in the Graduate School Office.

REGULATIONS

Regulations regarding ADMISSION, REGISTRATION, FEES AND FINANCES *are stated on pages 23-33; other University regulations, on pages 44-52.*

In addition, the Graduate School publishes a Student Handbook each academic year which contains updated information on the School's policies, regulations, and other matters of concern to enrolled or admitted students.

GRADES

Grades for graduate work are *A*, Excellent; *B*, Good; *C*, Minimum Pass; *F*, Fail; *I*, Incomplete; *W*, Authorized Withdrawal; *CR*, Credit.

The symbol *I* (incomplete) indicates that a satisfactory explanation has been given to the instructor for the student's failure to complete the required work for a course. The "incomplete" must be made up before the lapse of one calendar year. An "incomplete" which is not removed within one calendar year is automatically changed to an *F*.

The grade of *I* is also given for all thesis and dissertation preparation courses until the thesis or dissertation is completed. At the discretion of the instructor, the grade of *CR* may be assigned for an *Advanced Reading and Research* (usually numbered 398) course at the end of the semester in which the student reg-

isters for the course; otherwise, the grade of *I* is assigned for the course until the General Examination is successfully completed in its entirety.

Upon the satisfactory completion of the thesis, dissertation, or General Examination the grade *I* is changed to *CR* automatically. The *I* in these instances is allowed to stand as long as necessary without being changed to an *F*.

SCHOLARSHIP REQUIREMENTS

Graduate students are expected to maintain a minimum accumulative grade average of *B* (3.00) in all course work in the program of studies. Individual departments may require a higher average. The fields of Art History and Theory, English, History, and Psychology require a 3.25 average.

In the case of a student who receives a grade of *F* for a course in his program of studies, the Graduate School will require a departmentally approved written statement, justifying the student's continuance in the Graduate School and outlining the program to be followed. Continuation is contingent upon the Dean's approval. A course in the program of studies for which an *F* is received cannot be subsequently removed from the program even though another course is taken as a substitute.

A student may repeat for credit a course in which he has received a grade of *C* or above *only when permitted to do so by the department concerned*, unless the course description states that the course may be repeated for credit. A written statement to this effect must be submitted for approval to the Dean's Office by the appropriate departmental adviser. It is then filed with the Registrar.

A graduate student may take an advanced undergraduate course (courses numbered 101–200) for graduate credit only upon the approval of the Dean and the department at the time of registration. Such approval is granted only with the provision that students complete additional work in order to receive graduate credit.

PROGRAM OF STUDIES

The program of studies must be approved by the departmental adviser and filed in the Graduate School Office no later than November 1 for graduate students entering in the fall semester, or March 15 for graduate students entering in the spring semester. A program of studies may be revised, when necessary, by obtaining the approval of the departmental adviser and the Dean. The revision must be filed in the Graduate School Office.

CONTINUOUS REGISTRATION

All students must maintain continuous registration while working toward a degree, except during the summer session. If continuous registration is not maintained, the student is dropped from the degree program unless leave of absence is granted by the Graduate School. A Master's degree candidate who has completed his course work and has already registered for the thesis, must maintain continuous registration, if more time is needed to complete the thesis, by paying the continuous registration fee, which is equivalent to one semester hour.

LEAVE OF ABSENCE

If a student is temporarily unable to continue his program of studies, he may request leave of absence for a specific period of time, not to exceed one calendar year. An exception is made for students granted Military Leave. A student who is called to active duty (or who enlists) may be granted Military Leave (see page 48) for the duration of his period of military duty upon presentation to the Graduate School of a copy of his orders and a request for such leave. When the period of leave has expired, it is the student's responsibility to notify the Graduate School at least two months in advance of a given registration period of his intention to reregister. If he fails to reregister, his candidacy will be terminated.

WITHDRAWAL

Graduate students who intend to withdraw from the Graduate School should inform the School in writing. The last day for *complete* withdrawal without academic penalty is at the end of the eighth week of classes.

GRADUATION REQUIREMENTS

All students must file an "Application for Graduation" form and pay the required graduation fee at the time of registration for the last semester or summer session of the final year in which they intend to graduate. The student must be registered in the Graduate School during the semester he plans to graduate. Master's and doctoral candidates may graduate in May, February, or September. A student who has completed the requirements for a degree but has not yet been awarded the degree will be issued a letter to this effect upon request.

DEGREES

Listed below are the degree programs of the Graduate School of Arts and Sciences and the specific degrees offered, by field. The programs are directed by the departments concerned. Degree programs which bridge two or more departments are directed by committees composed of members of the departments concerned. For further information write to the Dean or the chairman of the appropriate department.

The graduate course work offered in support of these degrees is shown by department in this CATALOGUE.

GRADUATE FIELDS

Subject	Degrees Offered
I. Humanities	
American Civilization	M.A. Ph.D.
American Literature	M.A. Ph.D.
Art:	M.F.A.
Ceramics	
Design	
Graphics	
Painting	
Sculpture	

Subject	Degrees Offered	
Art History and Theory	M.A.	
Dramatic Art	M.F.A.	
English Literature	M.A.	Ph.D.
French Language and Literature	M.A.	Ph.D.
Germanic Languages and Literatures	M.A.	Ph.D.
Linguistics	M.A.	
Museology	M.A.	
Music:	Mus.M.	
Applied Music		
Conducting		
Music Composition		
Music Theory		
Musicology	M.A.	
Philosophy	M.A.	
Religion	M.A.	
Religion and Medical Care	M.A.	
Religious Education	M.A.	
Russian Language and Literature	M.A.	
Spanish American Literature	M.A.	Ph.D.
Spanish Language and Literature	M.A.	Ph.D.
II. Social Sciences		
Anthropology	M.A.	
Economics	M.A.	Ph.D.
Geography	M.A.	
History	M.A.	Ph.D.
*International Relations		Ph.D.
Latin American Studies	M.A.	
Political Science	M.A.	Ph.D.
Sociology	M.A.	Ph.D.
III. Physical and Mathematical Sciences		
Applied Mathematics	M.A., M.S.	
Applied Statistics	M.S.	
Chemistry	M.S.	Ph.D.
Forensic Science	M.S. in Forens.S.	
Geochemistry	M.S.	Ph.D.
Geology	M.A., M.S.	Ph.D.
Mathematical Statistics	M.A.	Ph.D.
Mathematics	M.S. for Teachers, M.A.	Ph.D.
Physics	M.A.	Ph.D.
IV. Biomedical and Related Sciences		
Anatomy	M.S.	Ph.D.
Biochemistry	M.S.	Ph.D.
†Biological Sciences	M.S.	Ph.D.
Biophysics		Ph.D.
Genetics	M.S.	Ph.D.

* The School of Public and International Affairs offers a Master of Arts field in International Affairs.

† Biology, Botany, and Zoology.

Subject	Degrees Offered	
Human Ecology		Ph.D.
Microbiology	M.S.	Ph.D.
Mycology	M.S.	
Pathology	M.S.	Ph.D.
Pharmacology	M.S.	Ph.D.
Physiology	M.S.	Ph.D.
Psychology	M.A.	Ph.D.
Speech Pathology and Audiology	M.A.	

COMBINED MASTER OF SCIENCE AND DOCTOR OF MEDICINE DEGREES

Students interested in the combined degrees of Master of Science and Doctor of Medicine must meet the requirements for admission of the Graduate School of Arts and Sciences and the School of Medicine.

The Master of Science program consists of a minimum of 30 semester hours of credit and the fulfilling of the tool requirement (see pages 95–96). A maximum of 12 semester hours of credit for graduate-level courses *completed as a part of the Doctor of Medicine degree curriculum* (and not already applied toward the Bachelor's degree) will be allowed in fulfillment of the requirements of the Master of Science degree. The remaining 18 semester hours of course work, which in most programs include a thesis, must be work in the basic medical sciences normally required for a Master of Science degree in the Graduate School of Arts and Sciences.

DUAL PROGRAM FOR THE DOCTOR OF MEDICINE AND DOCTOR OF PHILOSOPHY DEGREES

A dual program is available to qualified students who seek both the Doctor of Medicine and Doctor of Philosophy degrees. The requirements which must be fulfilled for both degrees are identical to those currently and separately established in the School of Medicine and the Graduate School of Arts and Sciences.

A student working toward these degrees may apply a maximum of 24 semester hours of approved work taken in the School of Medicine toward the total of 72 semester hours required to complete the requirements for the Doctor of Philosophy degree. Twenty-four hours of this requirement must be earned in graduate courses during periods when the student is not obligated to full-time enrollment in the School of Medicine, i.e., during summer sessions, vacation periods, etc. The final 24 semester hours of *Dissertation Research* may begin concurrently with the final semester of work leading to the General Examination. The estimated expected time for completion of this dual program is 6 years.

In order to enter the dual degree program, a prospective student first must apply for and gain admission to both the Graduate School of Arts and Sciences and the School of Medicine separately through established procedures. Upon admission to both schools, he may then apply for affiliation with the dual degree program. Work toward the Doctor of Philosophy degree is performed under the jurisdiction of a *departmental* Doctoral Committee.

REQUIREMENTS FOR THE DEGREES

THE MASTER'S PROGRAMS

Most of the requirements listed below are applicable to candidates for the degrees of Master of Arts, Master of Fine Arts, Master of Music, Master of Science, Master of Science for Teachers, and Master of Science in Forensic Science.

1. *General Requirements.*—For a Master's degree program *including* a thesis, a minimum of 30 semester hours of approved graduate work, including 6 semester hours of thesis research, is required. For a Master's degree program which does *not* include a thesis, 36 semester hours of approved graduate work are normally required. The program without the thesis is not an individual student option and is not available in every department. Departments can and often do set requirements above the minimum required by the Graduate School.

Work taken to make up deficiencies is never counted as part of the requirements leading to a Master's degree. Upon approval, up to one-half of the required graduate work may be taken in courses offered by the other affiliated institutions of the Consortium of Universities of the Washington Metropolitan Area, Inc., or by another degree-granting division of this University. If credit is transferred from another institution (see "Transfer of Credit" below), the number of semester hours which may be taken at an affiliated Consortium institution is reduced by the number of hours accepted as transfer credit.

It is expected that a Master's candidate will complete degree requirements within 3 years. Extensions beyond this 3-year period require approval of a written request.

2. *Academic Work Load.*—Full-time students register for 9 to 12 semester hours each semester; part-time students register for a minimum of 6 semester hours each semester. These requirements do not apply when a student has fewer than 9 semester hours (full-time) or 6 semester hours (part-time) remaining to complete his program. No more than 15 semester hours may be taken during any one semester.

3. *Transfer of Credit.*—A maximum of 6 semester hours of graduate course work may be approved for transfer to the Graduate School from another division of the University or another accredited college or university under the following conditions: the course work must have been taken prior to admission to the Graduate School, it must be approved as part of the student's program of studies, it must not have been applied to the completion of requirements for another degree, it must be graduate-level course work, it must have been taken within the past two years, and the student must have received a grade of *B* or better. A student seeking to transfer credits from the Division of University Students may transfer only those credits taken during the semester in which he applies and is accepted to the Graduate School of Arts and Sciences, provided the courses are approved and meet the above requirements. This action must be approved on a "Request Form" by the departmental adviser and the Dean. A transcript of the course work must be on file before the request can be considered.

4. *Tool Requirement.*—Except for candidates for the degrees of Master of Music, Master of Science in Forensic Science, and Master of Science for Teachers, and candidates in the field of Dramatic Art for the degree of Master

of Fine Arts, the successful completion of a tool subject is required and should be completed by the end of the second semester of registration in the Graduate School. Normally, a Master's candidate takes a reading examination in a foreign language to complete the tool requirement, but certain departments permit the replacement of the language by one of the other tool options (such as mathematics, statistics, or computer programming) which are available to doctoral students (see page 97). The substitution of one of the other tool options for language is a departmental option, not an individual student option. No Master's candidate may attempt a tool examination more than three times. Courses taken to fulfill the tool requirement are not counted in the semester-hour requirement for a Master's degree program.

A Master's candidate whose field is a foreign language or literature may not select that language to meet the tool requirement. A Master's candidate whose native language is not English may not select his native language to meet the tool requirement; he may select English to fulfill this requirement with the approval of his department and, upon receiving such approval, should contact the Department of English to make arrangements for an English examination.

A candidate for the degree of Master of Fine Arts in the fields of Painting, Sculpture, Ceramics, Design, or Graphics registers for a methods course selected by his department in lieu of the tool requirement.

5. *The Thesis.*—The main purpose of a Master's thesis is to demonstrate the student's ability to make independent use of the information and training acquired through his other disciplines and to furnish objective evidence of his constructive powers in his chosen field. The student registers for 6 semester hours of thesis research and must complete the thesis no later than two calendar years after his initial registration for thesis research. If the thesis is not completed within this time limit, the student must maintain continuous registration during the period required to complete the thesis. Registration for thesis research entitles the student to the advice and direction of the member of the faculty under whom the thesis is to be written. The thesis subject must be approved by the professor who will be directing the thesis. The thesis, in its final form with one copy and a certificate of approval signed by the thesis director and at least one departmental reader, must be presented to the Dean no later than the date announced in the University Calendar. All theses must meet the form, style, and other requirements set forth in a pamphlet, *Information Concerning Theses and Dissertations*, available in the Office of the Dean.

6. *Master's Comprehensive Examination.*—Most Master's degree candidates must pass a Master's Comprehensive Examination in the major subject. Examinations are held on dates fixed by the departments, so that results can be filed in the Graduate School Office the day before the faculty meets to approve the list of graduates (approximately two weeks before graduation).

A student who fails to pass the Master's Comprehensive Examination may, in exceptional circumstances, and with the approval of the department and the Dean, repeat the Examination at the next scheduled Examination date. If he fails a second time, no further opportunity to take the Examination is permitted.

THE DOCTOR OF PHILOSOPHY PROGRAM

The minimum requirements for the doctoral program are as follows:

1. *General Requirements.*—The program leading to the degree of Doctor of Philosophy requires completion of a minimum of 72 semester hours of ap-

proved graduate work for entering students whose highest earned degree is a baccalaureate. A minimum of 48 of these hours must be taken in preparation for the General Examination. Entering students whose highest earned degree is a Master's degree are required to register for a minimum of 48 semester hours of approved graduate work, no fewer than 24 of which must be taken in preparation for the General Examination. While completing the dissertation portion of the program, the student must register for 12 to 24 semester hours of *Dissertation Research*, depending on the number of hours completed prior to the General Examination. The exact number of semester hours required for any part of the total program is assigned by each department and may exceed the minimum required by the Graduate School.

2. *Academic Work Load.*—Full-time students register for 9 to 12 semester hours each semester; part-time students register for a minimum of 6 semester hours each semester. These requirements do not apply when a student has fewer than 9 semester hours (full-time) or 6 semester hours (part-time) remaining to complete his program.

3. *Transfer of Credit.*—Entering students who do not hold a Master's degree may request transfer of up to 24 semester hours of credit toward a doctoral degree for acceptable graduate work taken at the Master's degree level at George Washington University or another accredited college or university.

4. *Tool requirements.*—As early as possible, but before completion of the General Examination, the tool requirements specified by the department in charge of the student's program of studies must be fulfilled. If two tool requirements are specified, the first should be completed during the second semester of registration in the Graduate School, by either registering for a specified course or taking an examination. Courses taken to fulfill the tool requirement are not counted in the semester-hour requirement for the Doctor of Philosophy degree program. The tool options are as follows:

(a) two foreign language reading examinations;

(b) high-level proficiency in one foreign language;

(c) one foreign language reading examination and the completion of Math 30 and 31 with the grade of *B* or higher;

(d) one foreign language reading examination and the completion of one of the following courses (statistics or computer programming) with a grade of *B* or higher: Stat 49, 117, 118, 121, 197; Epid 230.

A doctoral student whose native language is not English may not elect his native language to meet a foreign language examination requirement. With the approval of his department, he may elect English to fulfill language requirement in any of the options listed above except (b). The student who is given approval to take a language examination in English should make arrangements with the Department of English.

A doctoral student may omit a tool preparation course at George Washington University if he has had a similar course at another college or university. However, his proficiency in that tool must be validated by an examination at this University.

Further details for meeting the various tool requirements are stated in the Graduate School's Student Handbook.

5. *The General Examination.*—Each student is required to complete the General Examination no later than the semester following the completion of course requirements. The General Examination is composed of a written examination 5 to 6 hours in length in each of the areas of study comprising the

student's total program; the time permitted between each examination is determined by the administering department. Some departments permit one or two areas of study to be "written off"; that is, a special, shorter examination is given after a year of course work in the area. A cumulative examination system is in effect in the fields of Chemistry and Physiology. Students in these fields should consult the appropriate department for information about this system.

6. *The Degree of Master of Philosophy.*— Upon departmental recommendation, the degree of Master of Philosophy may be awarded to doctoral candidates who have successfully completed all requirements for the Doctor of Philosophy degree up to and including the General Examination. Not all departments recommend students for this degree.

7. *The Dissertation and Final Examination.*—A dissertation is required of each doctoral candidate as evidence of his ability to perform scholarly research and interpret its results. The candidate normally enrolls for *Dissertation Research* upon completion of the General Examination; however, he may register for up to one-half of the required number of semester hours of *Dissertation Research* during the time the General Examination is being completed. After the required number of hours of *Dissertation Research* has been taken, if more time is needed to complete the dissertation, the student must maintain continuous registration (see page 48) each semester until the dissertation is finished and the Final Examination is passed. If the dissertation is not completed within 5 years after the date the General Examination is completed, the student may be required to retake the General Examination.

No later than the date specified in the University Calendar, the candidate must submit to the Dean the original and one copy of the dissertation and an abstract for inclusion in the Announcement of the Final Examination and for reproduction by University Microfilms, Inc.

When the dissertation has been approved by the Director and two members of the Doctoral Program Committee and filed with the Dean, the candidate takes the Final Examination, an oral examination which is open to the public. A committee of examiners (composed of Graduate School Faculty and, when appropriate, outside scholars) conducts the Examination. If the candidate passes, he is recommended by the Graduate School for the degree of Doctor of Philosophy.

Detailed information regarding regulations for the form and reproduction of the dissertation is available in the Office of the Dean. The successful candidate for the doctorate is required, before receiving his degree, to pay a fee to cover the expense of printing the Announcement of the Final Examination, and for the basic service rendered by University Microfilms, Inc.

POSTDOCTORAL STUDY

George Washington University doctoral graduates may continue any studies in the University without payment of tuition, and enjoy all University library privileges. Such graduates are required to pay the usual "continuous registration" fee and a University Center fee of $3.50 for each semester hour of course work in order to establish their active membership in the University. The use of laboratory space and equipment is contingent upon availability, and the cost of all laboratory or special library material is paid by the graduate. Special

arrangements for such privileges must be made with the Dean well before the semester in which the graduate wishes to register. Postdoctoral work taken under this privilege may not be applied toward any degree offered by the University.

FELLOWSHIPS AND FINANCIAL AID

A limited number of graduate teaching fellowships are available in most departments of instruction to students registered in the Graduate School of Arts and Sciences. In addition, the University participates in these government programs: National Science Foundation Traineeships and National Defense Education Act (Titles IV and VI) Fellowships. Other kinds of sponsored and University awards are available, but limited.

Students applying for admission who also wish to apply for a fellowship should submit the fellowship application and the application for admission by February 15; the necessary transcripts, Graduate Record Examination scores, and letters of recommendation should also be on file by this date. Students currently enrolled in the Graduate School should submit only the fellowship application and have current letters of recommendation on file by February 15.

Forms are available at the Office of the Graduate School of Arts and Sciences. Filing the fellowship application entitles the student to consideration for all the awards available in his department.

Students who wish to apply for loans should indicate their intent to do so on the application for admission. Information concerning loans is contained in a booklet, *Student Financial Aid*, available from the University's Student Financial Aid Office.





SCHOOL OF EDUCATION

Dean Rodney Tillman
Assistant Dean R.E. Baker

FACULTY*

Professors J.G. Allee, Jr., G.L. Angel, R.E. Baker, Perry Botwin, J.L. Breen, Marcella Brenner, W.T. Carroll, Mary Ellen Coleman, V.J. DeAngelis, H.G. Detwiler, L.H. Elliott, R.G. Hanken, A.D. Kirsch, Anthony Marinaccio, Leonard Nadler, Martha Rashid, Carol St. Cyr, Daniel Sinick, Loretta Stallings, Rodney Tillman

Associate Professors J.G. Boswell, Bertice Cornish, R.S. Cottrell, Jr., R.J. Frankie, Lyndale George, Eva Johnson, Virginia Kirkbride, Margaret McIntyre, Jeanne Snodgrass, C.E. Vontress, Maida Withers

Assistant Professors B.P. Berube, Gayle Clapp, Gloria Horrworth, Rita Ives, Nancy Johnson, Donald Linkowski, Mabel McEwan, Dorothy Moore, Honey Nashman, Ruth Peterson, R.W. Prouty, C.B. Reed, M.G. Van Dyke, Lawrence Winkler, Judith Young

Instructors K.E. Bumgarner, Nancy Roche, G.D. Wiggs, Linda Woolsey

COMMITTEES†

THE DEAN'S COUNCIL‡

1971: H.G. Detwiler, Anthony Marinaccio
1972: R.J. Frankie, Loretta Stallings

COMMITTEE ON ADVANCED GRADUATE STUDIES‡

R.E. Baker *(Chairman)*, G.L. Angel, J.G. Boswell, Perry Botwin, W.T. Carroll, Bertice Cornish, R.S. Cottrell, Jr., H.G. Detwiler, Virginia Kirkbride, A.D. Kirsch, Anthony Marinaccio, Leonard Nadler, Martha Rashid, Carol St. Cyr, Daniel Sinick, C.E. Vontress

COMMITTEE ON ADMISSION AND ADVANCED STANDING§

Rodney Tillman *(Chairman)*, Perry Botwin, J.L. Breen, H.G. Detwiler, J.Y. Ruth

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* The President of the University, the Vice President for Academic Affairs, the Registrar of the University, the Director of Admissions of the University, and the Director of Libraries of the University are ex officio members of the Faculty of the School of Education.
† The Dean and the Assistant Dean of the School of Education are ex officio members of all committees.
‡ Elected by the Faculty.
§ Appointed by the Dean

COMMITTEE ON SCHOLARSHIP

Rodney Tillman *(Chairman)*, Perry Botwin, J.L. Breen, H.G. Detwiler

INTRODUCTION

It is the purpose of the School of Education to prepare teachers, counselors, and administrators for leadership responsibilities, and to offer experienced teachers opportunities to extend their education. The School includes the departments of Education, Physical Education, and Special Education. It offers both graduate and undergraduate work. Other departments of the University provide general education and subject-matter courses needed for a well-balanced program of teacher education.

Individually planned programs are provided for liberal arts and other selected graduates who wish to prepare for teaching. The School also provides a wide range of courses to provisional teachers who wish to qualify for teaching certificates and teachers who wish to renew licenses. Degree programs in adult education –higher education, human resource development, rehabilitation counseling, and student personnel work in higher education are offered.

Laboratory and clinical facilities are provided by the University Reading Center and Speech and Hearing Clinic. In cooperation with public and private schools and a wide variety of social agencies, ample opportunity for field experience is provided.

In addition to a full schedule of weekday courses during the academic year, classes are offered in the evening, on Saturday, and during the summer.

HISTORICAL DEVELOPMENT

The University began offering professional courses for teachers in 1904–5, and in 1907 it established a Division of Education. In 1909, the Division of Education became the Teachers College, which in its early years was concerned largely with teacher preparation on the undergraduate level.

In 1928, the Teachers College became the School of Education, and greater provision was made for advanced study. Graduate enrollment has steadily increased, and today the School has a considerably larger number of graduate than undergraduate students.

EDUCATION FOR TEACHERS

Programs are planned to provide a broad general education, adequate mastery of the teaching-field content, and professional competence. The relative emphasis placed on each of these depends on the student's teaching-level plan. For example, elementary school teachers, since they teach all subjects, need preparation of greater breadth and less specialization than secondary school teachers.

Adequate preparation for teaching requires an acceptable minimum of four years of full-time study. Five years terminating in a Master of Arts in Education degree are needed for superior preparation which will command higher salaries and opportunities for promotion. During the first two years, the student is registered in the lower division of Columbian College of Arts and Sciences,

the liberal arts college of the University, where he acquires the background of general education so essential to success as a teacher. Here he is assigned a special adviser from the School of Education to assist in planning his program.

REGULATIONS

Regulations concerning ADMISSION, REGISTRATION, FEES AND FINANCES *are stated on pages 23–33; other University regulations, on pages 44–52.*

ACADEMIC WORK LOAD

Fifteen to 17 semester hours of credit constitute a normal program. A student with a quality-point index of 3.00 or higher may, with the permission of the Dean, enroll for 18 or 19 hours. No student may enroll for more than 19, except by permission of the Committee on Scholarship.

A student employed 15 hours or less a week may carry a normal program of college work.

A student employed from 16 to 25 hours a week may enroll for 12 or 13 hours. With a quality-point index of 3.00 or higher he may, with special permission of the Dean*, enroll for 14 or 16 hours.

A student employed from 26 to 34 hours a week may enroll for 9 or 10 hours. With a quality-point index of 3.00 or higher he may, with special permission of the Dean*, enroll for 11 or 13 hours.

A student employed 35 hours or more a week may enroll for 6 or 7 hours. With a quality-point index of 3.00 or higher he may, with special permission of the Dean*, enroll for 9 or 10 hours.

A student who increases his hours of employment after registration or at any time during a semester must report immediately to the Dean so that his program may be adjusted, if necessary.

The Bachelor's Degrees

THE SCHOOL OF EDUCATION OFFERS PROGRAMS leading to the degrees of Bachelor of Arts in Education and Bachelor of Science in Physical Education.

The program of each student must be approved by a faculty adviser. Since each student's program is defined by his particular needs, it is important that the student have a clear concept of his major interest in education, and also that he be familiar with the teaching-certificate requirements of the locality in which he expects to teach.

ENTRANCE REQUIREMENTS

Bachelor of Arts in Education and *Bachelor of Science in Physical Education.*—The satisfactory completion of the appropriate curriculum in the lower division of Columbian College of Arts and Sciences (see pages 78–79), or the equivalent from another accredited educational institution, is required. Appli-

* Request forms are available at the Office of the Dean. They should be filled out and returned to the Dean at least two weeks prior to Registration.

cants must, at an admissions interview, exhibit personality traits that give promise of success as a teacher.

REQUIREMENTS FOR THE DEGREES

To be recommended for a degree a student must satisfy the admission, residence, scholarship, and curriculum requirements.

RESIDENCE

Candidates for the Bachelor's degrees must complete satisfactorily while in the School of Education a minimum of 30 semester hours, 9 of which, with the approval of the adviser, may be in off-campus courses of the College of General Studies.

For full details concerning continuous registration, see page 48.

SCHOLARSHIP

For the system of grading and of computing scholarship, see pages 44–46.

In order to graduate, a student must have a quality-point index of at least 2.00.

Probation.—A student who fails to maintain a quality-point index of at least 2.00 is placed on probation. He remains on probation as long as his index is below 2.00, or until his probation is removed by the Committee on Scholarship.

Suspension.—A student on probation who fails to raise his index to 2.00 within the time specified may be suspended.

A student suspended for poor scholarship may, within ten days, appeal his case to the Committee on Scholarship through the Dean. If the case appears to be remediable and the student seems likely to improve his scholarship, the Committee may readmit him on probation. A student denied readmission may again, after a lapse of a calendar year, petition the Committee through the Dean for readmission. A student suspended twice will not be readmitted.

CURRICULUM REQUIREMENTS

In all Bachelor's curricula at least 30 semester hours must consist of courses numbered above 100.

CREDIT/NO CREDIT OPTION (see page 46)

BACHELOR OF ARTS IN EDUCATION

The objective of programs leading to the degree of Bachelor of Arts in Education is to provide (1) general educational backgrounds; (2) functional command of ideas, concepts, knowledge, and skills in one or more teaching fields; (3) mastery of basic professional information and skills adequate for the beginning teacher; and (4) development of attitudes needed for success in teaching.

The general educational backgrounds needed by prospective teachers are obtained through precollege education, college courses, work experience, leadership activities, student campus activities, and off-campus cultural opportunities.

Normally, from 65 to 67 semester hours of the total requirement are completed in the lower division of Columbian College of Arts and Sciences of this University or in an equivalent institution elsewhere (see "Education," pages 78–79). Since the teaching fields differ in content, scope, and complexity, some programs are longer than others.

Work experience, leadership activities, participation in student campus activities, and *the utilization of off-campus cultural opportunities.*—As part of formal course work and on their own initiative, students of the School of Education are expected to take full advantage of the many opportunities in the Washington area for developing leadership skills. Advisers are available to help students plan these experiences.

NATIONAL TEACHER EXAMINATIONS

All candidates for the degree of Bachelor of Arts in Education are required to take the National Teacher Examinations. Those expecting to graduate in June should take the Examinations the previous February or April; those expecting to graduate in February, in July or November. Students expecting to complete degree requirements during the Summer Sessions should take the Examinations in April or July.

Students receive individual reports of test scores and may avail themselves of the regular transcript services of the Educational Testing Service. Students must request the Testing Service to send copies of test scores to the School of Education.

Students required to take the Examinations must register for them in the Office of the Dean at least thirty days prior to the date of the Examination. Details concerning time, place, registration, and fees may be obtained in the Office of the Dean.

TEACHING-FIELD PREPARATION

Teaching-field preparation depends upon the teaching position for which the student is preparing. Those planning to teach in elementary schools need a degree of competency in several fields. Those preparing to teach in junior or senior high schools must demonstrate competency in a major teaching field. A minor teaching field is optional, but recommended. Ordinarily, students preparing to teach in evening schools for adults are required to prove competency in only one teaching field. The student should begin teaching-field preparation while in the lower division of Columbian College.

Teaching-field requirements, developed in cooperation with appropriate departments of the University, include satisfactory completion of prescribed academic courses in one or more fields, a satisfactory score on the special field examination of the National Teacher Examinations*, and satisfactory completion of the prescribed special methods courses.

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* Special field examinations of the National Teacher Examinations are available in elementary education; early childhood education; biology and general science; English language and literature; industrial arts; mathematics; chemistry; physics; and general science; social studies; physical education; business education; music education; home economics; and art education.

Students preparing to teach history or geography take the special field examination in social studies.

Students preparing to teach in fields in which special field examinations are not available (language and speech) must obtain a satisfactory score on a special field examination given by the instructor in the special methods course involved.

Prescribed academic courses vary in number in accordance with the scope and complexity of the teaching field and the license requirements of the various states. Minimum academic course requirements for each major teaching field are listed on succeeding pages. Minor teaching-field requirements are somewhat less than those of a major field. Students preparing to teach on the elementary level are advised to use electives to increase their mastery of content in an academic field or an area of specialization.

The prescribed courses in special methods are concerned primarily with methods of initiating, guiding, and evaluating learning experiences dealing with the content of teaching fields. They attempt to bring to the student specific suggestions drawn from the accumulated experience of successful teachers. However, in addition, the courses review the teaching-field content currently in use in schools, and examinations at the end of courses provide the final test of competency in the teaching fields.

PRESCRIBED COURSES IN THE VARIOUS TEACHING FIELDS

Art

		Semester Hours
Art 31–32:	Survey of Western Art, or	6
Art 71–72:	Introduction to the Arts in America	
Art:	To be selected from second-group Art History courses or any third-group Art History courses open to the undergraduate	6
Art:	To be selected from the following	27
*Art 21–22:	Design I: Basic	
Art 41–42:	Drawing I	
Art 51–52:	Ceramics I	
Art 57–58:	Graphics I	
Art 65–66:	Painting I	
Art 81–82:	Sculpture I	
Art 121–22:	Design II: Structured	
Art 123–24:	Design III: Individual Problems	
Art 125–26:	Painting II	
Art 127–28:	Painting III	
Art 131–32:	Ceramics II	
Art 143–44:	Serigraphy	
Art 151–52:	Ceramics III	
Art 153–54:	Graphics II	
Art 157–58:	Graphics III	
Art 163–64:	Design: Visual Communication	
Art 165–66:	Design: Advanced Visual Communication	
Art 175–76:	Design Projects	
Art 179–80:	Sculpture II	
Art 189–90:	Sculpture III	
	Total	39

* Art 21–22 or permission of Department Chairman is prerequisite to all other studio courses

Biology*

		Semester Hours
B Sc 11–12:	Introductory Biology for Science Majors	8
B Sc 101–2:	Invertebrate Zoology	6
B Sc 104:	Comparative Vertebrate Anatomy	4
B Sc 108:	Organic Evolution, or	
B Sc 127:	Genetics	3–4
B Sc 163:	Human Physiology, or	
B Sc 164:	Vertebrate Physiology	4
B Sc:	Advanced Botany courses as approved by the adviser	6
Chem 11–12:	General Chemistry	8
Phys 1:	General Physics	4
Phys 2:	Introduction to Modern Physics	4
	Total	47–48

Chemistry

†Chem 11–12:	General Chemistry, or	
Chem 15–16:	Intensive General and Analytical Chemistry	8
†Chem 22:	Introductory Quantitative Analysis	4
Chem 51–52:	Organic Chemistry	6
Chem 53–54:	Organic Chemistry Laboratory	2
Chem 111:	Physical Chemistry	3
Chem 134:	Descriptive Inorganic Chemistry	2
Chem 191:	History of Chemistry	2
Math 6:	Plane Trigonometry	3
Math 30:	Precalculus	3
Math 31:	Calculus of One Variable	3
Phys 1:	General Physics	4
Phys 2:	Introduction to Modern Physics	4
	Total	40–44

Earth Science

B Sc 3:	Introductory Biology for Nonscience Majors	3
Chem 11–12:	General Chemistry	8
Geol 1–2:	Introductory Geology	6
Geol 14:	General Petrology	3
Geol 101:	History of Geological Sciences	3
Geol 122:	Structural Geology	3
Geol 125:	Marine Geology	3
‡Math 3:	College Algebra	3
‡Math 6:	Plane Trigonometry	3
Phys 1:	General Physics	4

* Other courses recommended but not required—Chem 50, or 51–52 and 53–54; Math 31.
† Chem 22 required if Chem 11–12 is elected.
‡ Additional mathematics is required for some advanced geology courses.

		Semester Hours
Other Courses:	To be selected from the following as approved by the adviser	6–8
Anth 186:	Physical Anthropology	
Geol 128:	Geomorphology	
Geol 141:	Introductory Geochemistry	
Geol 147:	Chemical Geology in the Earth and Ocean Sciences	
Geol 151–52:	Invertebrate Paleontology	
Geol 163:	Sedimentation	
Geol 166:	Principles of Stratigraphy	
	Total	45–47

Elementary Education

Art:	As approved by the adviser	3
Geog 51:	Introduction to Geography	3
Geog 52:	World Regional Patterns	3
Hist 71–72:	Introduction to American History	6
Math 9, 10:	General Mathematics I, II	6
Music:	As approved by the adviser	3
Physical Education:	As approved by the adviser	3
Science:	As approved by the adviser	9–12
Other Courses:	To be selected from the following as approved by the adviser	6
Anth 1–2:	Introductory Anthropology	
*Econ 1–2:	Principles of Economics	
Hist 39–40:	European Civilization in Its World Context	
P Sc 5–6:	Introduction to Political Science	
Soc 1–2:	Introductory Sociology	
	Total	42–45

English

Engl 1 or 1x, 2:	English Composition	6
Engl 52:	Introduction to English Literature	3
Engl 71–72:	Introduction to American Literature	6
Engl 101:	Expository Writing	3
Engl 115:	Introduction to English Linguistics	3
Engl 127–28:	Shakespeare	6
Sp&D 11:	Voice and Diction	3
†Engl:	To be selected from the following as approved by the adviser	9
Engl 133–34:	The Romantic Movement	
Engl 135–36:	Victorian Literature	
Engl 137–38:	The 20th Century	
Engl 153–54:	The English Novel	
Engl 155–56:	The English Drama	
Engl 161–62:	Studies in American Literature	
Engl 163–64:	Major American Poets	
Engl 165–66:	American Drama	

* Recommended for students planning to apply for certification in Virginia
† Not required for the minor teaching field

		Semester Hours
Engl 167–68:	The American Novel	
Engl 171–72:	Major American Writers	
Engl 175–76:	Special Topics in American Literature	
Engl 177–78:	Contemporary American Literature	
	Total	39

French

Fren 9–10:	French Conversation and Composition, or	
Fren 12:	French Conversation and Composition (Intensive)	6
Fren 51–52:	Survey of French Literature, or	
Fren 91–92:	Analyse de texte	6
Fren 103:	Pronunciation and Intonation	3
Fren 108:	Cours avancé de grammaire	3
Fren 109–10:	Advanced French Conversation and Composition	6
French:	To be selected from the following	18
Fren 119–20:	French Literature of the Middle Ages and the Renaissance	
Fren 121–22:	17th Century French Literature	
Fren 123–24:	18th Century French Literature	
Fren 125–26:	19th Century French Literature	
Fren 127–28:	20th Century French Literature	
Fren 193:	Cours de style	
Other Courses:	Recommended from the following but not required	6
Art 109:	19th Century Art in Europe	
Art 110:	Contemporary Art	
Engl 115:	Introduction to English Linguistics	
Foreign Lang:	Other than French as approved	
Hist 141–42:	History of France	
Psyc 115:	Psychology of Language and Communication	
	Total	42–45

General Science[*]

B Sc 3–4:	Introductory Biology for Nonscience Majors	6
†Chem 11–12:	General Chemistry, or	
Chem 15–16:	Intensive General and Analytical Chemistry	8
†Chem 22:	Introductory Quantitative Analysis	4
Phys 1:	General Physics and	
Phys 2:	Introduction to Modern Physics, or	
Phys 9–10:	Introduction to Astronomy	6–8
‡Science:	Additional courses as approved by the adviser	10
Math:	To be selected from the following	9
Math 3:	College Algebra	
Math 6:	Plane Trigonometry	
Math 30:	Precalculus	
Math 31:	Calculus of One Variable	
Math 32:	Calculus of Several Variables	
Math 33:	Calculus of Vector Functions	
	Total	41–47

[*] May not be chosen as a minor teaching field

† If Chem 11–12 is elected, it must be followed by Chem 22. If Chem 15–16 is elected, Chem 22 is not required; however, Chem 50 is recommended following Chem 16

‡ Eighteen semester hours in one science field are required for certification

Geography

		Semester Hours
Geog 51:	Introduction to Geography	3
Geog 52:	World Regional Patterns	3
Geol 1:	Introductory Geology	3
*Geog:	To be selected from the following	21
Geog 103:	Cartography and Graphics	
Geog 104:	Special Techniques in Cartography	
Geog 125:	Transportation Geography	
Geog 126:	Economic Geography	
Geog 127:	World Population and Settlement	
Geog 132:	Resources and Environment	
Geog 133:	Geography of Poverty and Hunger	
Geog 134:	Location of Industry	
Geog 141:	Urban Settlement	
Geog 144:	Environmental Adaptation	
Geog 145:	Cultural Geography	
Geog 146:	World Political Geography	
Geog 153:	Europe	
Geog 161:	Latin America	
Geog 172:	Historical Geography	
	Total	30

German

Germ 9–10:	German Conversation and Composition	6
Germ 51–52:	Introduction to German Literature	6
Germ 179–80:	Advanced Conversation and Composition	6
*German:	Additional courses as approved by the adviser	14
	Total	32

History†

Hist 39–40:	European Civilization in Its World Context, or	6
Hist 91–92:	World Civilizations	6
Hist 71–72:	Introduction to American History	6
Hist:	Research Seminar (see adviser, Department of History)	
Hist:	Six semester hours in each of three of the following groups as approved by the adviser	18
*Hist:	Additional semester hours from any one of the following groups as approved by the adviser	6
	Total	42

GROUP 1: AMERICAN HISTORY

Hist 167: American Colonial History
Hist 169: The American Revolution
Hist 170: U.S. Early National History

* Not required for the minor teaching field.
† See page 300 for regulation concerning the waiver of introductory History courses

Hist 171–72: U.S. Social History
Hist 173–74: The Negro in American History
Hist 175–76: U.S. Political History
Hist 177: The Ante-bellum South
Hist 179–80: U.S. Economic History
Hist 181–82: U.S. Diplomatic History
Hist 183: Oversea Expansion of the United States
Hist 185: Representative Americans

GROUP 2: EUROPEAN HISTORY

Hist 108: The Ancient Near East and Egypt to 600 A.D.
Hist 109: Early Aegean and Greek Civilizations to 200 B.C.
Hist 110: The Roman World to 455 A.D.
Hist 111–12: Medieval History
Hist 113: Early Middle Ages
Hist 121: The Renaissance in Western Europe
Hist 131–32: History of Germany
Hist 139–40: World History in the 20th Century
Hist 141–42: History of France
Hist 145–46: History of Russia
Hist 147: Economic History of Europe
Hist 149–50: European Diplomatic History
Hist 151–52: History of England and Great Britain
Hist 153: Tudor England
Hist 154: Stuart England
Hist 157: 20th Century European Diplomatic History
Hist 158: Modern Jewish History

GROUP 3: THE EASTERN WORLD

Hist 138: History of World Communism
Hist 145–46: History of Russia
Hist 187: History of Modern China
Hist 188: History of Chinese Communism
Hist 193: History of the Near East
Hist 194: History of the Modern Near East
Hist 195–96: History of East Asia

GROUP 4: LATIN AMERICAN HISTORY

Hist 162: History of Spain and Portugal
Hist 163–64: History of Latin America
Hist 165: History of Brazil
Hist 166: History of Mexico
P Sc 177: Governments and Politics in Latin America
P Sc 178: Latin America: Political Patterns and International Relations

Mathematics

		Semester Hours
Math 30:	Precalculus	3
Math 31:	Calculus of One Variable	3
Math 32:	Calculus of Several Variables	3
Math 33:	Calculus of Vector Functions	3
Math 34:	Introduction to Linear Algebra	3

		Semester Hours
Math 121:	Introduction to Abstract Algebra	3
Math 124:	Introduction to Matrix Theory	3
Math 135:	Projective Geometry	3
*Math:	Three additional courses in Mathematics approved by the adviser	9
Stat 155:	Introduction to Probability	3
	Total	36

Music

Mus 5–6:	Elementary Harmony	6
Mus 103–4:	History of Music	6
Mus 131–32:	Advanced Harmony	6
Applied Music:	Voice or major instrument	6
Applied Music:	Minor instruments	6
Ensemble:	Choral or Orchestral	3
Music Literature:	As approved by the adviser	6
Music Theory:	As approved by the adviser	3
	Total	42

Physics

Math 30:	Precalculus	3
Math 31:	Calculus of One Variable	3
Math 32:	Calculus of Several Variables	3
Math 33:	Calculus of Vector Functions	3
Phys 1:	General Physics	4
Phys 2:	Introduction to Modern Physics	4
Phys 31–32:	Introduction to Theoretical Physics	4
Phys 51–52:	Introduction to Experimental Physics	4
Phys:	To be selected from the following	3
Phys 161:	Mechanics I	
Phys 163:	Optics	
Phys 164:	Thermodynamics	
Phys 165:	Electromagnetic Theory	
Phys 167:	Principles of Quantum Physics	
	Total	31

Russian

Slav 9–10:	Russian Conversation and Composition	6
Slav 91–92:	Introduction to Russian Literature	6
Slav 125:	Russian Linguistic Structure	3
Slav 126:	Contrastive Russian-English Analysis	3
Slav 131:	18th Century Russian Literature	
Slav 141–42:	19th Century Russian Literature, or	
Slav 151:	20th Century Pre-Revolutionary Russian Literature, and	6
Slav 152:	Contemporary Russian Literature	3
Slav 197:	Special Problems in Teaching Russian	

* Not required for the minor teaching field

		Semester Hours
*Slav:	Additional courses from the following as approved by the adviser	9
Slav 101–2:	Readings in Modern Russian	
Slav 109–10:	Advanced Russian Conversation and Composition	
Slav 128:	Dostoevsky, the Man and the Artist	
Slav 143–44:	The Russian Novel	
Slav 145:	The Russian Short Story of the 19th Century	
Slav 146:	The Russian Short Story of the 20th Century	
Slav 153:	Turgenev	
Slav 154:	Gogol	
Slav 156:	Leo Tolstoy, His Life and Works	
Slav 161–62:	Russian Culture	
Slav 165:	Soviet Literature from the Revolution to World War II	
Slav 166:	Soviet Literature from World War II to the Present	
Slav 193–94:	Introduction to Slavic (non-Russian) Literature—in English	
	Total	39

Social Studies†

Econ 1–2:	Principles of Economics	6
Hist 39–40:	European Civilization in Its World Context, or	
Hist 91–92:	World Civilizations	6
Hist 71–72:	Introduction to American History	6
P Sc 5–6:	Introduction to Political Science	6
Other Courses:	To be selected from the following	6
Anth 1–2:	Introductory Anthropology	
Geog 51:	Introduction to Geography	
Geog 52:	World Regional Patterns	
Soc 1–2:	Introductory Sociology	
*Other Courses:	Second-group courses, as approved by the adviser, from Anthropology, Economics, Geography, History, Political Science, and Sociology	12
	Total	42

Spanish

Span 9–10:	Spanish Conversation and Composition, or	
Span 12:	Spanish Conversation and Composition (Intensive)	6
Span 51–52:	Survey of Spanish Literature and Civilization	6
Span 91–92:	Explicación de textos	6
Span 109–10:	Advanced Spanish Conversation and Composition	6
Span:	Two full-year courses selected from second-group Spanish or Spanish American Literature courses	12
Other Courses:	Recommended from the following	6
Engl 115:	Introduction to English Linguistics	
Foreign Lang:	Other than Spanish as approved	
Hist 162:	History of Spain and Portugal	
Hist 163–64:	History of Latin America	
Hist 165:	History of Brazil	
Hist 166:	History of Mexico	
Psyc 115:	Psychology of Language and Communication	

* Not required for the minor teaching field
† See page 300 for regulation concerning the waiver of introductory History courses

		Semester Hours
Span 193:	Curso de estilo	
Span:	Second-group courses in Spanish and Spanish American Literature not previously elected	
	Total	42

Special Education*

S Ed 101:	Seminar: an Overview of Special Education	3
S Ed 102:	Teaching the Child with Special Needs: Techniques and Methods	3
S Ed 103:	Teaching the Child with Special Needs: Creative Programming	3
S Ed 170:	Interpersonal Intrapersonal Relationships for Teachers	3
S Ed 189:	Preprofessional Internship in Special Education I	3
S Ed 190:	Preprofessional Internship in Special Education II	3
S Ed 290:	Practicum in Teaching in Special Education	6
	Total	24

Speech and Drama

Sp&D 1:	Communicative Speaking and Listening	3
Sp&D 11:	Voice and Diction	3
Sp&D 32:	Oral Interpretation of Literature	3
Sp&D 101:	Phonetics	3
Sp&D 112:	Advanced Public Speaking	3
Sp&D 121:	Group Discussion and Conference Leadership	3
Sp&D 169:	Introduction to Creative Dramatics	3
Sp&D 171:	Bases of Speech and Hearing	3
Area of Specialization:	Selected from one of the following groups as approved by the adviser	12
	Total	36

GROUP 1: SPEECH COMMUNICATION†

Sp&D 126:	Argumentation and Debate
Sp&D 127–28:	Advanced Debate Practice
Sp&D 133–34:	Radio and TV Broadcasting
Sp&D 143:	History and Criticism of European Public Address
Sp&D 144:	History and Criticism of American Public Address

GROUP 2: DRAMA†

Sp&D 115–16:	Acting
Sp&D 151:	Stagecraft
Sp&D 152:	Advanced Stagecraft
Sp&D 154:	Play Directing
Sp&D 155–56:	Play Production Practice
Sp&D 165–66:	History of the Theater

* Minor teaching field only. S Ed 102, 103, 170, 189, and 190 must be taken prior to the senior year.
† Not required for the minor teaching field

PROFESSIONAL EDUCATION

The basic professional information, skills, and attitudes needed by beginning teachers are provided through a sequence of courses to be taken in the junior and senior years. Lectures and class discussions are closely coordinated with field work. Instruction is differentiated to meet the needs of those preparing to teach on the various levels—elementary school, junior high school, senior high school, and adult.

Professional Courses—Secondary

		Semester Hours
Educ 108:	Human Development, Learning, and Teaching	3
Educ 112:	Educational Measurement, or	
Stat 53:	Introduction to Statistics in Psychology and Education	3
Educ 123:	Society and the School	3
Educ 131:	Secondary School Principles and Methods	3
Educ 134:	Student Teaching in Secondary Schools	6–9
Special Methods:	Three to six semester hours from the following courses	3–6
Educ 136:	Teaching English in Secondary Schools	
Educ 137:	Teaching Speech	
Educ 138:	Teaching Social Studies in Secondary Schools	
Educ 139:	Teaching Art in Secondary Schools	
Educ 140:	Teaching Mathematics in Secondary Schools	
Educ 142:	Teaching Music in Secondary Schools	
Educ 144:	Teaching Science in Secondary Schools	
Educ 146:	Teaching Foreign Languages	
	Total	21–27

Professional Courses—Elementary

Educ 108:	Human Development, Learning, and Teaching	3
Educ 111:	Elementary School Curriculum and Methods	15
Educ 112:	Educational Measurement, or	
Stat 53:	Introduction to Statistics in Psychology and Education	3
Educ 123:	Society and the School	3
Educ 135:	Student Teaching in Elementary Schools	9
	Total	33

BACHELOR OF SCIENCE IN PHYSICAL EDUCATION

The curriculum, which is designed to prepare students for teaching in elementary and secondary school programs of physical education, offers opportunities for specialization in dance, elementary or secondary school physical education.

The student wishing to prepare to teach another subject in addition to physical education may use his elective hours to work toward a minor teaching field. Relevant work in Columbian College may be counted.

PREREQUISITE

For the first two years of the Bachelor of Science in Physical Education curriculum, see Columbian College of Arts and Sciences, page 79.

CURRICULUM

Specialization in Dance

Junior and Senior Years

		Semester Hours
Educ 108:	Human Development, Learning, and Teaching	3
Educ 112:	Educational Measurement	3
Educ 123:	Society and the School	3
Educ 134:	Student Teaching in Secondary Schools, or	
Educ 135:	Student Teaching in Elementary Schools	6–9
PE 107:	Teaching Ethnic Dance	2
PE 108:	Dance Improvisation	1
PE 109:	Dance Composition I	1–2
PE 110:	Dance Composition II	1*
PE 117:	Teaching Modern Dance	3
PE 119:	Creative Dance for Children	3
PE 120:	Repertory	1†
PE 134:	Rhythmic Analysis through Creative Movement	3
PE 135–36:	Survey of Dance History	6
PE 141–42:	Dance Production	4
PE 149:	Anatomy and Kinesiology	3
PE 157:	Dance Technique and Theory	1
PE 164:	Physiology of Exercise	3
Elective:		5–13
	Total	60

Specialization in Elementary School Physical Education

Junior Year

Educ 108:	Human Development, Learning, and Teaching	3
Educ 123:	Society and the School	3
PE 101:	Physical Education in the Elementary School	3
PE 102:	Physical Education Curriculum in the Elementary School	3
PE 113:	Field Experience: Practicum in Physical Education	3
PE 130:	Motor Performance in Childhood	3
PE 138:	History, Principles, Organization, and Administration of Physical Education	3
PE 149:	Anatomy and Kinesiology	3
Elective:		9
	Total	33

Senior Year

Educ 112:	Educational Measurement	3
Educ 135:	Student Teaching in Elementary Schools	9
PE 114:	Field Experience: Practicum in Physical Education	3
PE 139:	Teacher Behavior	3
PE 164:	Physiology of Exercise	3
Elective:		6
	Total	27

* May be repeated once for credit
† May be repeated 3 times for credit

Specialization in Secondary School Physical Education

Junior Year

		Semester Hours
B Sc 163:	Human Physiology	4
Educ 108:	Human Development, Learning, and Teaching	3
Educ 123:	Society and the School	3
PE 111-12:	Sports Education Technique I–II	6
PE 113:	Field Experience: Practicum in Physical Education	3
PE 138:	History, Principles, Organization, and Administration of Physical Education	3
PE 149:	Anatomy and Kinesiology	3
Elective:		5
	Total	30

Senior Year

Educ 112:	Educational Measurement	3
Educ 134:	Student Teaching in Secondary Schools	6–9
PE 114:	Field Experience: Practicum in Physical Education	3
PE 139:	Teacher Behavior	3
PE 164:	Physiology of Exercise	3
Elective:		12
	Total	30–33

The Degree of Master of Arts in Education

PROGRAMS OF STUDY LEADING TO THE DEGREE of Master of Arts in Education are designed to enable prospective teachers and teachers of experience to increase their knowledge of professional and academic information and skills and prepare for special types of educational service. They also provide opportunities for college graduates in other disciplines to acquire needed professional education, as well as study in the subjects which they are planning to teach.

From the various related departments of the University, the student and his adviser select courses to give the student an adequate background in his chosen field of service. Programs for teachers-in-service and experienced teachers planning to re-enter the profession are differentiated from those for students without teaching experience.

Master's programs are available in the following fields: (1) adult education; (2) classroom teaching; (3) comparative education; (4) curriculum; (5) dance; (6) early childhood education; (7) elementary administration; (8) elementary education; (9) employee development; (10) guidance; (11) higher education; (12) history of education; (13) human growth and development; (14) philosophy of education; (15) physical education (candidates may specialize in dance, elementary school physical education, driver safety education, or special education); (16) reading; (17) rehabilitation counseling; (18) secondary administration; (19) secondary education; (20) special education—diagnostic-prescriptive teaching, children with behavioral problems, and early

childhood special education; and (21) student personnel work in higher education.

For teachers interested in developing or strengthening their academic competence, the "classroom teaching" field normally permits 15 to 18 semester hours of work in departments other than education. These programs are designed to meet the needs of teachers-in-service who need additional work in content to qualify for advanced certification or to improve their classroom skills; and may also be helpful to previously trained teachers planning to reenter the profession. The major emphasis is upon strengthening both the academic and professional competencies of the teacher.

Additional information concerning these programs may be obtained by writing or telephoning the Office of the Dean.

FIVE-YEAR PROGRAM

A candidate entering the School of Education from the lower division of Columbian College of Arts and Sciences (or with equivalent preparation) may choose a three-year program leading to the degrees of Bachelor of Arts in Education and Master of Arts in Education to be conferred simultaneously. The first year of this combined program will be devoted to teaching-field preparation; the work of the second year will include the degree of Bachelor of Arts in Education junior-year professional courses and a maximum of 18 semester hours of graduate courses; that of the third and final year, senior-year undergraduate professional courses and the remaining graduate courses needed for the Master's degree. Student teaching, to be elected in the third year, may not be taken for graduate credit. A quality-point index of at least 2.50 in undergraduate courses must be attained before beginning the work of the senior year, and the program must meet all the requirements for the degrees of Bachelor of Arts in Education and Master of Arts in Education.

ENTRANCE REQUIREMENTS

A Bachelor's degree from an accredited institution, an undergraduate quality-point index of 2.50 or above ($C+$ average), demonstrated interest in teaching, and personality traits that give promise of better-than-average success as a teacher, are required.

Two years of successful teaching are required before admission to candidacy in the fields of guidance and school administration.

ADMISSION TO CANDIDACY

Candidates whose undergraduate preparation does not include equivalents of the basic requirements for the degree of Bachelor of Arts in Education must make up deficiencies and may be required to take designated tests.

ADVANCED STANDING

For the record, advanced standing is granted for approved courses taken at other accredited institutions, but a minimum of 30 semester hours must be completed at this University as a Master's candidate.

A maximum of 12 semester hours of advanced courses completed in this University in excess of the requirements for the Bachelor's degree may be credited

toward the Master's degree if the work fits in with the student's plan of specialization and is approved in writing by the Dean before being undertaken.

Advanced standing is not granted for work completed five or more years before application for admission or readmission to Master's candidacy.

REQUIREMENTS FOR THE DEGREE

PLAN OF STUDY

The plan of study leading to the degree of Master of Arts in Education requires a minimum of 33 hours of graduate credit. The plan may, at the student's option, include a thesis carrying 6 hours of graduate credit. Whether or not a student selects the thesis option, a minimum of 18 hours, including a course in educational research methods and procedures, must be from courses planned primarily for graduate students (third-group courses). A minimum of 12 hours, not including the thesis or the research course, must be from courses offered by the School of Education.

Programs may include additional teaching-field preparation. In such cases, however, undergraduate and graduate courses combined must be at least equivalent to the undergraduate requirements for the degree of Bachelor of Arts in Education (see pages 103–15).

Programs are planned initially in conference with an admission adviser in the Office of the School of Education and subsequently with a designated adviser in the candidate's area of specialization. These programs are based on the interests of the candidate, his previous background, and the certification requirements of the state and locality in which the candidate plans to teach.

All degree requirements must be completed within a period of six years.

RESIDENCE

A candidate for the Master's degree is required to complete satisfactorily 30 semester hours in residence in the School. With the approval of the adviser, 9 of the 30 hours may be off-campus courses in the College of General Studies.

SCHOLARSHIP

For graduate work grades are indicated as *A*, Excellent; *B*, Good; *C*, Minimum Pass; *F*, Fail; *I*, Incomplete; *W*, Authorized Withdrawal; *CR*, Credit. Grades *A*, *B*, *C*, and *F* are counted in computing the quality-point index (see pages 45–46).

A quality-point index of 3.00 is required for graduation. Students who receive the grade of *C* in more than 6 semester hours are subject to suspension. Students who receive a grade of *F* must confer with the Dean of the School of Education before enrollment for further work.

Whenever a grade has not been assigned, the symbol *I* (incomplete) or the symbol *W* (authorized withdrawal) will be recorded. The symbol *I* indicates that a satisfactory explanation has been given to the instructor for the student's failure to complete the required work of the course. An "incomplete" cannot be made up after the lapse of one calendar year except by written permission of the Dean's Council. An incomplete which is not removed within one calendar year is automatically changed to an *F*. An incomplete cannot be removed by reregistering for the course.

THE THESIS

The choice of the thesis subject must be approved in writing by the student's adviser and filed in the Office of the Dean. A statement of the School of Education standards for the thesis and printed copies of detailed regulations regarding the form and reproduction of the thesis are available in the Office of the Dean.

Payment of tuition for the thesis entitles the candidate, during the period of registration, to the advice and direction of the member of the faculty under whom the thesis is to be written. In case a thesis is unfinished, an additional calendar year may be granted without further tuition payment. The student must, however, maintain continuous registration (see page 48) during this period. If the preparation of the thesis extends beyond the additional calendar year, the student must register for the entire 6 hours of thesis again and pay tuition as for a repeated course.

MASTER'S COMPREHENSIVE EXAMINATION

In addition to the course examinations, the candidate must pass a special three-hour examination on his area of specialization. Candidates for the examination must be registered for the semester it is to be taken, and must file a written application in the Office of the School of Education no later than thirty days prior to the date of the examination.

The Degree of Education Specialist

THE SCHOOL OF EDUCATION PROVIDES A PROGRAM of advanced study leading to the degree of Education Specialist for students with Master's degrees in Education who seek further professional preparation for specific objectives.

ENTRANCE REQUIREMENTS

The degree of Master of Arts in Education from this University (or the equivalent), a satisfactory score on the Miller Analogies Test or the Graduate Record Examination, and two years of successful pertinent experience, are required.

ADMISSION TO CANDIDACY

Each applicant must be interviewed and recommended by a staff member of the School of Education or by a representative in the candidate's locality appointed by the Dean.

SCHOLARSHIP

Scholarship requirements for the degree of Education Specialist are the same as those for the degree of Master of Arts in Education (see page 119).

PROGRAMS OF STUDY AND DEGREE REQUIREMENTS

Individual programs are developed, through the faculty-adviser plan, to fit the candidates' abilities, interests, needs, and career goals. Thirty semester hours be-

yond the requirements of the degree of Master of Arts in Education at this University are required. At least 21 hours of this work must be taken on campus at this University. A maximum of five calendar years is allowed for completion of the program.

At least 12 of the required 30 hours must be in appropriate graduate courses in Education selected from the following areas: (1) foundations and cognate study, (2) background and general principles of the field of study, (3) an area of specialization.

THE COMPREHENSIVE EXAMINATION

Successful completion of two three-hour written examinations is required.

THE ORAL EXAMINATION

The final oral examination must be passed at least three weeks before the degree is to be conferred. The examination committee consists of members of the staff of the School of Education and at least one successful practitioner in the appropriate area of specialization, appointed by the Dean of the School of Education.

The Degree of Master of Arts in Teaching

THE SCHOOL OF EDUCATION OFFERS AN INTENSIVE fifth-year program, partially supported by paid teaching internships, designed to prepare selected graduates of accredited liberal arts colleges for teaching in elementary schools. Successful fulfillment of the program's requirements provides the professional courses necessary for certification as an elementary teacher. Students may receive the degree of Master of Arts in Teaching on completion of the program or receive credit for 15 semester hours of graduate work toward the degree of Master of Arts in Education.

For details, write to the Chairman of the Department of Education, M.A.T. Program in Elementary Education, School of Education, George Washington University, Washington, D.C. 20006.

ADMISSION TO THE PROGRAM

To be admitted as a student-intern, an applicant must (1) have a Bachelor's degree from an accredited liberal arts institution, including courses related to the general education requirements for teacher certification; (2) show evidence of interest in children and a sincere desire to teach; (3) submit three written references attesting to quality of academic record and personality; (4) submit a score on the Aptitude Test of the Graduate Record Examination or the Miller Analogies Test; and (5) be interviewed by the University Selection Committee, or under arrangements specified by the Committee and approved by the Dean of the School of Education.

PLAN OF STUDY

Beginning with a six-week summer session, the program includes a September experience with full-time study in the fall semester. Course work during this

time is planned to help each student gain understanding of (1) the characteristics of elementary school children, (2) the subject-matter areas of the elementary school curriculum, (3) basic dimensions of teaching methodology, (4) the relationship between educational theory and methods, (5) educational tests and measurements, and (6) the role of the school in American society.

During the fall semester, students will be given full-time student teaching assignments in a nearby public school. This part of the program will permit the student to use, in an actual teaching situation, the educational theories and methods which he has been studying.

A salaried internship during the spring semester in one of the cooperating school systems in the area gives the student an opportunity to assume the responsibilities of a beginning teacher, with the help and guidance of University and public school staff members. Seminar meetings will be scheduled weekly for discussion of common problems and for cooperatively planned work on individual and group needs of interns. Each student plans, conducts, and reports on an Action Research Project.

The Degree of Doctor of Education

THE SCHOOL OF EDUCATION OFFERS PROGRAMS of advanced study leading to the degree of Doctor of Education. These programs, which are under the supervision of the Committee on Advanced Graduate Studies, provide major fields of study in administration and supervision, adult education, curriculum, elementary administration, elementary education, guidance and counseling, higher education, human growth and development, human resource development, secondary administration, secondary education, special education, supervision, and teacher education. Supporting fields are available in administrative specialties, history of education, philosophy of education, rehabilitation counseling, and student personnel work in higher education. With the approval of the Committee on Advanced Graduate Studies and of the departments concerned, one or two supporting fields may be taken in other departments of the University. All programs require study of interrelated areas of education and a doctoral dissertation in the major field of study.

ADMISSION

The applicant must have adequate preparation for advanced study, including graduate work in fields prerequisite to his objective equivalent to that required for the degree of Master of Arts in Education at this University, at least three years of successful pertinent educational experience, acceptable personal qualities, and a capacity for creative scholarship and effective leadership.

The applicant first arranges for an interview with the Assistant Dean for advanced graduate studies to explore his needs in relation to the resources of the School and to guide him in his application for doctoral study. The required admission procedures will be explained at this time.

PLAN OF STUDY

In general, from two to three years of full-time study beyond the degree of Master of Arts in Education, or the equivalent in part-time study, are required. Programs are individually planned. It is estimated that, for the average student, the work required for the total program will be 66 semester hours, including a minimum of 12 semester hours of dissertation research.

Each program is divided into two parts. The first consists of preparation for comprehensive examinations in a major field of study and each of four supporting fields, and a tool-subject requirement. The second is composed of research investigation, the writing of a dissertation, and the final oral examination.

Students who have completed the comprehensive examinations and who were not registered for doctoral study under the payment plan in effect prior to July 1, 1967, must register for a minimum of 6 semester hours of Dissertation Research (491) a semester until 12 hours have been completed, and a minimum of 3 semester hours a semester thereafter until the satisfactory completion of the final examination.

COMPREHENSIVE EXAMINATIONS

When the student is admitted to doctoral candidacy, he is assigned to a committee, each member of which is responsible for guiding him in his preparation for one of the four required comprehensive examinations in supporting fields or the comprehensive major field examination. The candidate must arrange individual conferences with the committee members to determine the content of each field and to receive guidance in his preparation for the examination.

The supporting field examinations, which are taken first, are six-hour written examinations. A tool-subject requirement may be established by the candidate's Dissertation Committee if it is necessary for the successful completion of his dissertation. This requirement must be completed prior to the major field examination. The major field examination is a written twelve-hour examination, six hours on each of two successive days.

The candidate begins the second part of his program after the satisfactory completion of all supporting field examinations; the tool subject, if required; and the major field examination.

THE DISSERTATION

A dissertation is required as evidence of ability to perform scholarly research and to interpret and present its results.

During the first part of the program, the Dean appoints a Dissertation Committee, consisting of a major adviser as Director, usually the major field adviser, and two additional faculty members who serve as readers. The candidate is required to submit a proposal for his dissertation to this Committee, which determines its acceptability and recommends approval to the Committee on Advanced Graduate Studies. The dissertation is completed under the direction of the Dissertation Committee.

No later than the date specified in the calendar, the candidate must submit to the Dean three complete copies of the dissertation and two copies of an abstract for inclusion in the announcement of the examination and for reproduction by University Microfilms, Inc. Printed copies of detailed regulations regarding the form and reproduction of the dissertation, preparation of the abstract, and serv-

ices offered by University Microfilms, Inc., are available in the Office of the Dean. The successful candidate for the doctorate is required, before receiving his degree, to pay a fee to cover the expense of printing the Announcement of the Final Examination, and for the basic service rendered by University Microfilms, Inc.

THE FINAL EXAMINATION

When the dissertation has been accepted, the Director recommends the candidate to the Dean for the final oral examination, which must be passed at least three weeks before the degree is to be conferred. The examination is open to the public and is conducted by a committee of the Faculty, appointed by the Dean, supplemented by at least two leaders in the candidate's field of study from outside the University. Candidates who successfully pass the oral examination are recommended for the degree by the Faculty of the School of Education.

RESIDENCE AND CONTINUOUS STUDY

All the preparation for the degree, including examinations and work other than courses and seminars, which is done under the direction of an adviser, must be done in residence. The student must remain registered in the School of Education, except when the Dean or the Committee on Advanced Graduate Studies has granted a leave of absence. Failure to register each semester of the academic year may result in lapse of candidacy. Subsequent readmission is subject to whatever new conditions and regulations have been established by the Committee on Advanced Graduate Studies.

The supporting and major field examinations must be completed within five years of the date of admission, and the entire program must be completed within eight years, regardless of full-time or part-time study. Each candidate is required to complete one semester or more of his program in full-time study. All candidates in programs for teachers and other professional school personnel are required to spend at least one academic year in continuous full-time study. For candidates in other programs (adult education, higher education, and human resource development), two alternative options for full-time study are available. Information concerning these plans will be provided by the Assistant Dean for Advanced Graduate Studies upon request by the candidate.

Special Programs and Services

EDUCATION OF TEACHERS OF EXCEPTIONAL CHILDREN

The School of Education offers a program for the education of teachers of exceptional children. Laboratory experiences are arranged in schools for handicapped children in the metropolitan area. Students are accepted at the junior- or senior-year undergraduate, Master's, Education Specialist, and Doctoral levels. By special permission, teachers, school administrators, and adequately prepared students from other schools and colleges of the University may elect these courses.

Inquiries concerning the program and the availability of scholarships and fellowships should be directed to Dr. Perry Botwin, Department of Special Education, George Washington University, Washington, D.C. 20006.

GRADUATE PROGRAM IN REHABILITATION COUNSELING

The School of Education offers a federally funded Master's degree program for the preparation of rehabilitation counselors. These professional personnel assist persons who are disabled or disadvantaged to assume a proper place in society. The two-year program combines fieldwork with course work in preparing students for immediate employment in an expanding field that yields high humanitarian and financial rewards. Both the profession and the program are interdisciplinary, drawing upon such related areas as guidance, medicine, psychology, social work, sociology, and special education.

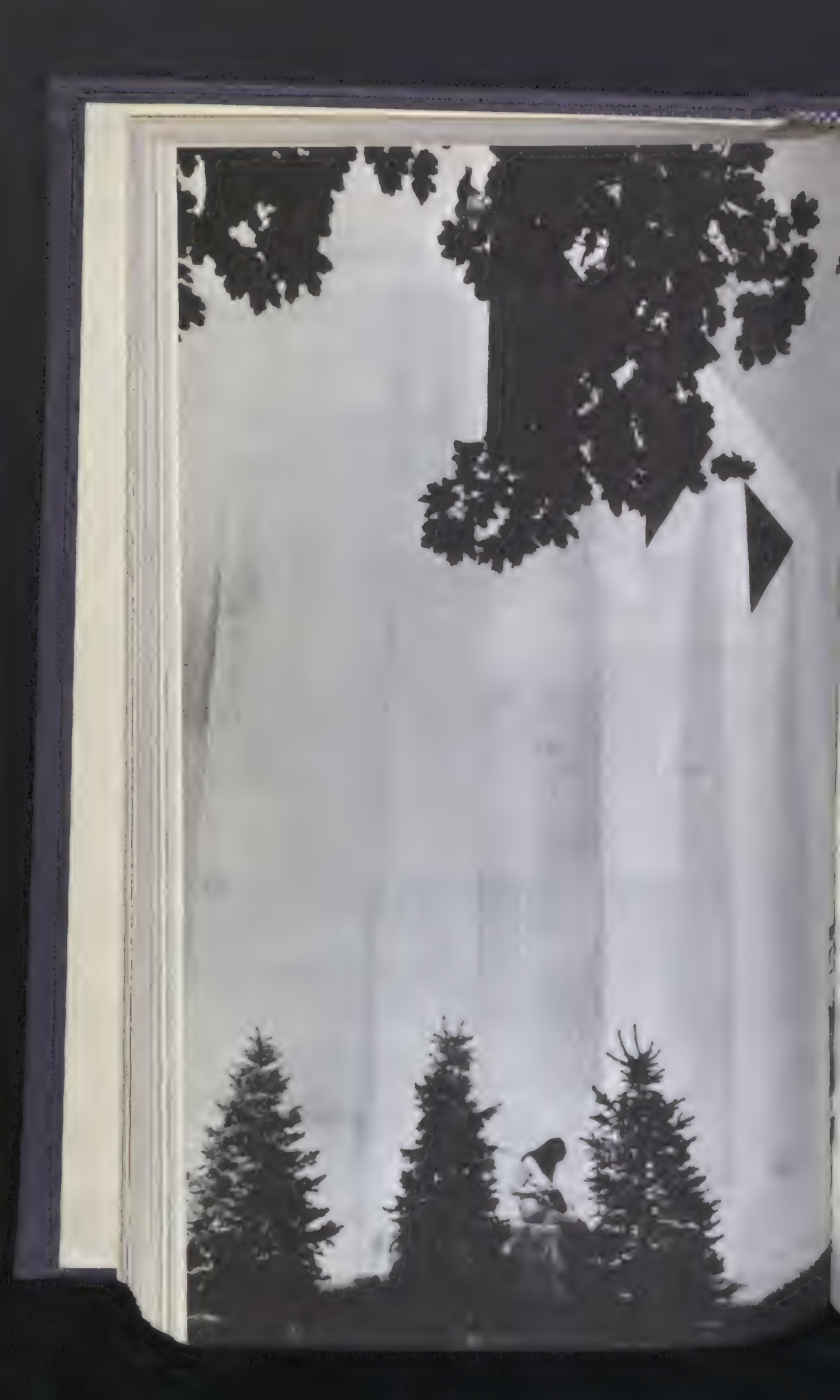
Traineeships, including tuition and stipends, are available for full-time students. Information and applications are available from Dr. Daniel Sinick, Rehabilitation Counselor Education, School of Education, George Washington University, Washington, D.C. 20006

CERTIFICATION CURRICULA

The School of Education provides individually planned programs for liberal arts graduates and for housewives and retired military personnel with appropriate degrees who wish to prepare for teaching. Those seeking certification, but not wishing to work for a degree, may enroll in a certification program if they meet the admission, scholarship, and personality requirements of degree candidates. The School also provides a wide range of courses of interest to teachers who wish to renew licenses.

READING CENTER (see page 54)





SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION

Dean J.C. Dockeray

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Professors Frederick Amling, H.F. Bright, D.S. Brown, D.R. Cloutier, J.C. Dockeray, R.B. Eastin, R.F. Erieson, F.H. Gibbs, Leon Gintzig, W.A. Hamrick, J.L. Jessup, E.J.B. Lewis, G.L. Lippitt, H.R. Page, D.D. Roman, S.M. Rosen *(Visiting)*, Waldo Sommers, K.E. Stromsem, Edwin Timbers, M.M. Wofsey

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Adjunct Associate Professor H.C. Demoody

Assistant Professors Elizabeth Adams, S.R. Chitwood, F.H. Dorner, S.S. Fuller, Sherwin Greene, W.H. Guy *(Research)*, M.M. Harmon, John Lobuts, Jr., James McKeon *(Research)*, D.B. Rasmussen, P.N. Reeves, T.F. Riley, J.R. Roman, Jr., S.N. Sherman, W.E. Smith, J.W. Waldrip

Adjunct Assistant Professor Norma Loeser

Instructors Patricia Cleary *(Research)*, L.W. Katz, Richard Switalski *(Research)*

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* The President of the University, the Vice President for Academic Affairs, the Registrar of the University, the Director of Admissions of the University, and the Director of Libraries of the University are ex officio members of the Faculty of the School of Government and Business Administration.

† The Dean of the School is an ex officio member of all committees.

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The School of Government and Business Administration Advisory Council operates as an advisory group on policy, finance, and community relations. It consists of responsible members of the business and government communities, and of the faculty, administrators, and students of the School.

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* The President of the University, the Chairman of the Board of Trustees, the Vice President for Academic Affairs, the Vice President for Development, and the Dean of the School of Government and Business Administration are ex officio members of the Council

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STUDENT MEMBERS OF THE COUNCIL

Clifton Brown
John Burke

INTRODUCTION

This school was organized as the School of Government in 1928. During the next two decades, programs in business administration and public administration were added, and the emphasis gradually shifted from undergraduate to graduate study. The name was changed in 1960 to the School of Government, Business, and International Affairs to reflect more accurately the offerings of the School. A division of the School was effected in 1966, and two schools were established—the School of Government and Business Administration, a primarily professionally-oriented school: and the School of Public and International Affairs, a primarily policy-oriented school.

OBJECTIVES

The principal objective of the School of Government and Business Administration is to prepare its graduates for positions in the management of complex organizations in both business and government. The degree programs are designed to prepare students both for *entrance* into business and government and for *advancement* to high-level management positions.

Programs in the School include examination of administrative principles and quantitative approaches to decision-making common to both business and government. These programs stress the points at which major policy decisions of either business or government must give consideration to related policy decisions of the other. Emphasis is placed on the fact that management education is not limited to organizational techniques but is, in the broadest sense, education for management responsibility.

It is the policy of the School to emphasize a broad fundamental education as the best preparation for positions carrying management or administrative responsibility.

Undergraduate programs concentrate the first two years in a broad liberal arts curriculum drawn from the social sciences, humanities, quantitative methods, and a limited number of courses in administration. Students in the freshman and sophomore years are registered in the lower division of Columbian College of Arts and Sciences, the liberal arts college of the University. Here they are assigned special advisers from this School to assist them in planning their pro-

grams. Students in the junior and senior years are registered in the School of Government and Business Administration. Here they expand their work to include (1) the functions of business enterprise, (2) the economic and legal environment of business, (3) the implications of modern analytical techniques based on quantitative methods, (4) the study of organization theory and human relations, and (5) the practice of problem-solving techniques.

Graduate programs develop the elements common to all management positons regardless of the nature of the operation. Master's degree programs are based on study of the principles of management, human relations, and problem-solving plus an area of specialization. Specialized concentrations are offered in the various fields of Business Administration, Public Administration, Health Care Administration, and Urban and Regional Planning.

Responsive to the needs of the Washington community, the School has followed the policy of making many of its educational activities available in off-campus centers in and around the metropolitan area of Washington. The off-campus work leads to a degree carrying a different designation; thus, the Bachelor of Business Administration degree on campus has a substantial equivalence to the Bachelor of Science in Administration degree offered off campus in facilities furnished by government or business organizations. The Master of Business Administration, Master of Public Administration, Master of Urban and Regional Planning, and Master of Arts in Government degrees are offered on campus, while the Master of Science in Administration degree is the only graduate degree offered off campus. The off-campus programs have strong support in the area and provide significant contact with the business and government communities.

SUMMARY

In order to provide students with a common body of knowledge of business or governmental administration, programs include the equivalent of at least one year of work comprising the following areas.

1. In the case of business enterprise, a background of the concepts, processes, and institutions in marketing and distribution, production, and financing functions; in the case of governmental administration, a background of concepts, processes, and institutions of planning, programming, budgeting, personnel practices, and policy formulation in government.
2. A background of the economic and legal environment of business and government enterprise, along with consideration of the social and political influences on business.
3. A basic understanding of the concepts and methods of accounting or budgeting, quantitative methods, and information systems.
4. A study of organization theory, interpersonal relationships, control and motivation systems, and communications.
5. A study of administrative processes under conditions of uncertainty, including the integration of analysis and policy determination at the over-all management level.

ACADEMIC STATUS

The School of Government and Business Administration has maintained full membership in the Middle Atlantic Association of Colleges of Business Administration since 1961. It joined the Council on Graduate Education for Public

Administration in 1966. By invitation, in 1968, the School became a charter academic member of the American Association of Collegiate Schools of Business Assembly. The programs in Public Accounting designed to prepare students for Certified Public Accountants examinations have been approved by the state boards of New York and Maryland. The program in Hospital Administration is accredited by the National Accrediting Commission on Graduate Education for Hospital Administration.

REGULATIONS

Regulations concerning ADMISSION, REGISTRATION, FEES AND FINANCES *are stated on pages 23–33; other University regulations, on pages 44–52.*

ATTENDANCE

A student may not attend classes until registration is completed and fees due are paid. A student may be dropped from any course for undue absence.

The student is held responsible for all the work of the courses in which he is registered, and all absences must be excused by the instructor in charge before provision is made for him to make up the work missed.

A student suspended for any cause may not attend classes during the period of suspension.

WITHDRAWAL

Withdrawal from a course or from the University without academic penalty is permitted during the first four weeks after registration for the fall or spring semester. Withdrawal after this period is permitted only in unusual circumstances, and requires certification by the instructors of courses for which the student is registered that he is doing passing work (see "Withdrawal," page 46).

INDEPENDENT STUDY PLAN

A student of *demonstrated capacity*, with a special interest in the subject matter of a course, may be permitted to undertake study under the personal direction of an instructor, in accordance with the rules of the appropriate department. Credit under this plan is limited to the specific course credits normally allowed when taken on a class basis.

Bachelor of Business Administration

THE SCHOOL OFFERS PROGRAMS leading to the degree of Bachelor of Business Administration in the fields of Accounting, Business Administration, and International Business.

ENTRANCE REQUIREMENTS

The satisfactory completion of the *Accounting, Business Administration, and International Business* curriculum in the lower division of Columbian College of

Arts and Sciences (see pages 79–80), or the equivalent, is required. Students transferring from other colleges and universities as juniors must offer an acceptable broad-based liberal arts program, or the equivalent.

REQUIREMENTS FOR THE DEGREE

ACADEMIC WORK LOAD

A full-time student not on probation may not ordinarily take more than 15 semester hours. A student employed more than 24 hours a week, who is not on probation, may not take more than 9 semester hours.

A full-time student whose quality-point index is 3.50 or higher may not take more than 18 semester hours. A student employed more than 24 hours a week, whose index is 3.50 or higher, may take up to 12 semester hours.

A student who accepts employment after registration or at any time during a semester must report immediately to the Dean, so that his program may be adjusted if necessary.

Exception to these rules will require the approval of the Dean.

SCHOLARSHIP

In order to graduate, a student must have the following: (1) a general quality-point index of at least 2.00 and (2) an index in his major of at least 2.50. The major includes the required courses and courses taken in the group options.

DEAN'S HONOR LIST

The names of students who achieve a quality-point index of 3.50 or higher are placed on the Dean's Honor List for that semester. Appearance on the list will be limited to (1) full-time students registered for a minimum of 12 semester hours and (2) part-time students registered for a minimum of 12 semester hours over a period of two consecutive semesters, which may include a summer term.

PROBATION

A student whose quality-point index falls below 2.00 after completing a minimum of 12 semester hours of study will be placed on probation. This probation extends over the period in which the student attempts 12 semester hours of work which may include remedial studies as prescribed.

SUSPENSION

A student whose quality-point index is 1.50 or below or whose index remains below 2.00 at the end of his probationary period may be suspended. A student suspended for poor scholarship may apply for readmission after the lapse of either the fall or spring semester. To be considered for readmission, he must pass prescribed tests and submit evidence to the Dean's Council that during his absence from the University he has so conducted himself as to indicate that he will profit by readmission. A student readmitted after suspension is on probation and must maintain a current quality-point index of at least 2.50 on each 12 semester hours of work undertaken until his cumulative index is 2.00. In no

case will the probationary period after readmission exceed 24 hours of study. A student suspended twice for poor scholarship will not be readmitted.

RESIDENCE

A minimum of 30 semester hours, including at least 12 hours in the major field, must be completed while registered in the School of Government and Business Administration. This requirement applies to students transferring within the University as well as to students transferring from other institutions. Summer work may be counted toward the residence requirement, but in no case may the period of residence aggregate less than thirty weeks. Unless special permission is granted by the Dean to pursue work elsewhere, the work of the senior or final year must be completed in the School of Government and Business Administration.

USE OF CORRECT ENGLISH

Any student whose written or spoken English in any course is unsatisfactory may be reported by the instructor to the Dean. The Dean may assign supplementary work, without academic credit, varying in amount with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition fee is charged. The granting of a degree may be delayed for failure to make up such deficiency in English to the satisfaction of the Dean.

CREDIT/NO CREDIT OPTION (see page 46)

CORRESPONDENCE AND HOME-STUDY COURSES

Credit for correspondence or home-study courses is not acceptable and cannot be applied toward a degree.

CURRICULUM REQUIREMENTS

To be recommended by the Faculty for graduation, candidates are required to complete, in addition to the appropriate freshman and sophomore work, a minimum of 60 semester hours during the junior and senior years, as set forth in one of the following curricula.

EXAMINATIONS FOR WAIVING CURRICULUM REQUIREMENTS

A required course may be waived by the satisfactory passing of a waiver examination authorized and prescribed by the department or curriculum adviser concerned. Passing this examination does not entitle the student to any hours of credit toward the degree. Request to take the examination should be made to the curriculum adviser and the required fee paid at the Office of the Cashier before the date set for the examination.

MAJOR FIELDS FOR THE BACHELOR'S DEGREE

Candidates for the degree of Bachelor of Business Administration must have completed the requirements of the Columbian College of Arts and Sciences

Lower Division curriculum in Accounting, Business Administration, and International Business, pages 79–80, or the equivalent.

ACCOUNTING

For the first two years of the Accounting curriculum, see pages 79–80.

Required—Junior and Senior Years

		Semester Hours
Acct 101:	Cost and Budgetary Control	3
Acct 121:	Intermediate Accounting	3
Acct 161:	Federal Income Taxation	3
Acct 171:	Auditing	3
Acct 181:	Accounting Systems	3
Acct 191:	Advanced Accounting	3
B Ad 101:	The Business Environment	3
B Ad 102:	Fundamentals of Management	3
B Ad 131:	Business Finance	3
B Ad 141:	Basic Marketing Management	3
B Ad 161:	Commercial Law: Contracts, Sales, Agency, Bailments	3
B Ad 181:	Manufacturing Production	3
B Ad 198:	Case Problems in Management	3
Econ 121:	Money and Banking	3
Mgt 118:	Introduction to Data Processing	3
Mgt 119:	Data Processing Programming	3
Stat:	Three semester hours selected from the following	
Stat 111:	Business and Economic Statistics I	
Stat 155:	Introduction to Probability	
Stat 187:	Theory of Sampling	
Elective:	Three semester hours may be selected from Accounting or Business Administration	3
	Six semester hours selected from courses other than in Accounting, Business Administration, or Economics	6
	Total	60

Normal Schedule for Accounting Courses

Junior Year: Fall Semester— Acct 101, 121, 161; Spring Semester—Acct 181, 191, (161 if not elected in fall).
Senior Year: Fall Semester—Acct 171; Spring Semester—Accounting elective.

Accounting Practice Internship

An internship in accounting practice is open to Accounting majors during the semester break of the senior year. Students will be paid a salary while conducting audits under senior supervision of participating C.P.A. firms. Other internships with industry and government are available. The general requirements are at least 15 semester hours of Accounting courses, including a course in auditing, with a 2.85 or higher average and an over-all grade average of 2.50 or higher. For further information consult A.J. Mastro, Chairman of the Department of Accounting, George Washington University.

BUSINESS ADMINISTRATION

For the first two years of the Business Administration curriculum, see pages 79–80.

The program in Business Administration is designed to provide the broad foundation required for eventual top leadership in either governmental or business administration. It consists of the 36 semester hours of *required* courses; 15 hours in one of the following group options; and 9 hours of electives, normally advanced courses in liberal arts subjects.

Required—Junior and Senior Years

		Semester Hours
Acct 193:	Business Budgeting	3
B Ad 101:	The Business Environment	3
B Ad 102:	Fundamentals of Management	3
B Ad 105:	Personnel Management	3
B Ad 131:	Business Finance	3
B Ad 141:	Basic Marketing Management	3
B Ad 161:	Commercial Law: Contracts, Sales, Agency, Bailments	3
B Ad 181:	Manufacturing Production	3
B Ad 198:	Case Problems in Management	3
Econ 121:	Money and Banking	3
Mgt 118:	Introduction to Data Processing	3
Psyc 144:	Personnel and Industrial Psychology	3
Group Option:	To be selected from one of the following groups	15
Elective:	To be selected in consultation with the adviser	9
	Total	60

GROUP OPTIONS

Seven areas of specialization are open to Business Administration majors. The 15 hours taken in each of these options require the approval of the adviser. The group option and the individual courses within the option should be selected *at the beginning of the junior year*. The student should contact the Chairman of the Department of Business Administration for assignment of an adviser.

GROUP I: AUTOMATIC DATA PROCESSING

The following courses provide the basic academic foundation for positions in data processing in government, business, and industry. They also give the student an understanding of the manager's use of data processing as a vital managerial technique.

Mgt 119: Data Processing Programming
Mgt 120: Data Processing Systems
Stat 111, 112: Business and Economic Statistics I, II

GROUP II: ECONOMICS

The following courses provide the basic academic foundation for such positions as financial economic analyst, industrial economic analyst, and market research analyst in business and government.

B Ad 132: International Business Finance
B Ad 133: Capital Formation

B Ad 176: International Business Theory and Policy
*Econ 101: Intermediate Microeconomic Theory
*Econ 102: Intermediate Macroeconomic Theory
Econ 158: Industrial Organization
Econ 161, 162: Public Finance I, II
Econ 181–82: International Economics
Stat 111, 112: Business and Economic Statistics I, II

GROUP III: FINANCE

The following courses provide the basic academic foundation for such positions as credit analyst, supervisor in a financial institution, bond cashier, trust officer, bank examiner, and similar positions in federal or international financial institutions.

*Acct 111: Financial Statement Analysis
Acct 121: Intermediate Accounting
B Ad 113: Real Estate
B Ad 121: Fundamentals of Insurance
B Ad 122: Insurance Estate Planning
B Ad 132: International Business Finance
B Ad 133: Capital Formation
B Ad 135: Managerial Finance
*B Ad 138: Investment and Portfolio Management
B Ad 163: Law in Relation to the Form of Business Units: Corporations, Partnerships, and Trusts
Econ 101: Intermediate Microeconomic Theory

GROUP IV: MARKETING

The following courses provide the basic academic foundation for such positions as sales manager, marketing manager, product development manager, research director, buyer, advertising director, sales promotion manager, and credit manager.

*B Ad 143: Marketing Research
B Ad 144: International Marketing Management
*B Ad 145: Sales Management
B Ad 147: Advertising
B Ad 158: Physical Distribution Management
B Ad 171: Principles of Transportation
B Ad 175: Introduction to Foreign Trade
B Ad 177: Foreign Markets
B Ad 178: Management of International Business Operations

GROUP V: PERSONNEL MANAGEMENT

The following courses provide the basic academic foundation for such positions as personnel manager, employee relations manager, and employment manager in business and government service.

*B Ad 106: Problems in Personnel Management
*B Ad 107: Collective Bargaining
Jour 145: Principles and Problems of Public Relations
Psyc 129: Theories of Personality
Psyc 131: Psychological Tests
Sp&D 121: Group Discussion and Conference Leadership

* Required for this group option

GROUP VI: STATISTICS

The following courses provide the basic academic foundation for such positions as financial statistician, planning statistician, industrial statistician, and rate analyst in business and government.

Stat 91: Principles of Statistical Methods
Stat 110: Quality Control and Reliability Techniques
*Stat 111, 112: Business and Economic Statistics I, II
Stat 117: Analysis of Variance
Stat 118: Regression Analysis
Stat 155: Introduction to Probability
Stat 157–58: Introduction to Mathematical Statistics

GROUP VII: TRANSPORTATION AND TRAFFIC MANAGEMENT

The following courses provide the basic academic foundation for management positions in transportation firms and in traffic departments of other types of business firms and government agencies. The program should also aid in the preparation for the examinations for membership in the American Society of Traffic and Transportation.

B Ad 158: Physical Distribution Management
*B Ad 171: Principles of Transportation
B Ad 172: Public Utilities
*B Ad 173: Transportation Systems Management
B Ad 174: Urban Transportation
*B Ad 175: Introduction to Foreign Trade
CE 183: Urban Planning
Geog 125: Transportation Geography

INTERNATIONAL BUSINESS

For the first two years of the International Business curriculum, see pages 79–80.

This program is designed to provide the basic academic foundation for positions in international business, both in private industry and in government. It consists of 39 semester hours of *required* course work and 21 hours of electives. Any modification of the program must be made with the consent of the adviser.

Required—Junior and Senior Years

		Semester Hours
B Ad 102:	Fundamentals of Management	3
B Ad 131:	Business Finance	3
B Ad 132:	International Business Finance	3
B Ad 141:	Basic Marketing Management	3
B Ad 144:	International Marketing Management	3
B Ad 161:	Commercial Law: Contracts, Sales, Agency, Bailments	3
B Ad 175:	Introduction to Foreign Trade	3
B Ad 176:	International Business Theory and Policy	3
B Ad 178:	Management of International Business Operations	3
B Ad 181:	Manufacturing Production	3
Econ 121:	Money and Banking	3
Mgt 118:	Introduction to Data Processing	3
Psyc 144:	Personnel and Industrial Psychology	3

* Required for this group option

	Semester Hours
Elective: The 21 semester hours of elective courses should be selected, in consultation with the adviser, from Accounting, Business Administration, Economics, Geography and Regional Science, Political Science, Sociology, Statistics, or any modern foreign language; however, up to 9 semester hours of courses in other approved areas may be substituted with the permission of the adviser	21
Total	60

The Master's Degrees

Master of Business Administration.—The degree of Master of Business Administration is this School's top professional Master's degree in business. It is designed to develop the analytical ability and perspective which will contribute to success as a responsible executive. Because of the increasingly close relationship between government and business, the programs for this degree also provide an excellent background for many government careers.

Master of Arts in Government.—Washington, D.C., is uniquely situated for students of public administration. Public figures, professional government administrators, and specialized libraries are resources readily available to this School's programs in public administration. The degree of Master of Arts in Government is designed for graduate students who are seeking an education for entry into the federal service in an administrative capacity, or who wish to emphasize the academic elements of public administration. This program, like the Master of Public Administration and Master of Business Administration degree programs, provides several fields of concentration, such as operations research, urban and regional planning, or behavioral factors in administration, from which the candidate may select for in-depth education.

Master of Public Administration.—The School of Government and Business Administration is located in the midst of a vast complex of government and government-related activities which are local, regional, national, and international in scope. This location provides a living laboratory of public administration for study and access to a unique concentration of working expertise in public administration. The Master of Public Administration degree provides a course of study particularly appropriate for those in the government service. It is a professional degree, preparing graduates for positions of higher responsibility in the public service and generally improving their competence in public employment. Several elements of the program are taken in common with offerings in the Master of Business Administration degree program. Work done for this degree may lead directly toward the degree of Doctor of Public Administration.

Master of Arts in Health Care Administration.—This new professional degree was authorized by the faculty in 1969 as an alternative to the degrees of Master of Business Administration and Master of Public Administration in the field of Health Care Administration. Study in depth may be made in various aspects of Health Care Administration found in short-term hospitals, long-term health facilities (such as extended-care institutions, nursing homes, mental hospitals, facilities for the aged), group practice clinics, health information systems, and comprehensive health planning agencies.

Master of Urban and Regional Planning.—This professional planning degree was approved by the Board of Trustees in 1967. The degree is designed as preparation for careers on the municipal, county, state, and national levels. Study is designed to provide a broad professional education, to develop competence in planning and methodology, and to emphasize the analytical ability and creativity necessary for solving urban and regional problems.

Master of Science in Administration.—The Master of Science in Administration degree is offered only off campus. It provides a course of study appropriate for those students currently working in government and business. It is a professional degree, preparing graduates for positions of higher and broader responsibility and generally improving their competence as administrators.

ENTRANCE REQUIREMENTS

A Bachelor's degree from an accredited college or university, with a quality-point index of 3.00 (a *B* average) in the relevant undergraduate field, is required.

Students who lack sufficient undergraduate study in business or related fields may be required to make up these deficiencies by taking specified undergraduate courses and maintaining a 3.00 average in those courses.

Applicants for admission to programs leading to the degree of Master of Business Administration must submit acceptable scores on the Admission Test for Graduate Study in Business; applicants for admission to programs leading to the degrees of Master of Arts in Government, Master of Arts in Health Care Administration, Master of Public Administration, and Master of Urban and Regional Planning must submit scores on the Admission Test for Graduate Study in Business *or* the Graduate Record Examination. It is the responsibility of the applicant to make arrangements for the required test with the Educational Testing Service, Princeton, N.J. 08540. Correspondence concerning the Admission Test for Graduate Study in Business should be addressed to Box 966; concerning the Graduate Record Examination, to Box 955.

GENERAL REQUIREMENTS

A program of greater length, including undergraduate background courses, may be assigned for an applicant whose undergraduate degree was in a field other than the graduate program he wishes to follow, or whose undergraduate record indicates a weakness in required background courses.

Master's degrees are awarded by vote of the Faculty on completion of the required course work, an acceptable thesis or the equivalent, and the passing of the Master's Comprehensive Examination. An applicant whose background does not include the necessary courses must take a program longer than the minimum hours required.

Second-group courses (numbered 101–200) may be counted toward the Master's degree only when registration for graduate credit has been approved at the time of registration by the Dean and the curriculum adviser. No work counted toward a Bachelor's degree may also be counted toward a Master's degree.

Full-time students are normally expected to register for 9 to 12 semester hours each semester. A graduate student who is employed more than 20 hours

a week may not take more than 6 semester hours. All work for a Master's degree must be completed in five years, unless an extension of time is granted by the Dean.

A student who expects to continue his studies for the degree of Doctor of Business Administration or Doctor of Public Administration after receiving the Master's degree should ask for assistance in planning his program so that he may qualify for admission to candidacy for the Doctorate.

No credit is granted for work done *in absentia* or without formal instruction, except for hospital residency, supervised field experience, and the thesis, which may be completed *in absentia* with the permission of the department, curriculum adviser, or committee concerned.

MASTER'S COMPREHENSIVE EXAMINATION

In addition to individual course examinations the candidate must pass a general written Master's Comprehensive Examination. In writing the examination the student is expected to correlate what he has learned in his course work and his reading in the literature of his fields. The examination normally requires from seven to nine hours writing time. Sections broadly cover the various fields in which the candidate has prepared himself.

The examinations are scheduled three times a year, in December, April, and July, and should be taken during the last semester of course registration or shortly after completion of the prescribed course work. If there is a lapse of time between completion of course work and the taking of the examination, the student must maintain continuous registration and must be registered for the semester in which the examination is taken.

The candidate should consult with his adviser, well in advance, as to the dates of his examination and the definition of the subject-matter fields which his examination is to cover. A written application is filed with the department supervising the student's elective field of study no later than 30 days prior to the examination date. Before applying for the examination, the student must have completed all of the courses in his program or be enrolled in his last semester, and he must have achieved a 3.00 (*B*) average.

SCHOLARSHIP

Grades for graduate work are *A*, Excellent; *B*, Good; *C*, Minimum Pass; *F*, Fail; *I*, Incomplete; *W*, Authorized Withdrawal; and *CR*, Credit.

An average of *B* or better is required for the Master's degree. The grade of *C* is not considered as failing but must be counter-balanced by a grade of *A* in a graduate course of equal status.

A Master's candidate who receives a grade of *F* is required to present cause for consideration by the Dean's Council as to why he should be allowed to continue his studies.

Whenever a grade has not been assigned, the symbol *I* (incomplete) or the symbol *W* (authorized withdrawal) will be recorded. The symbol *I* indicates that a satisfactory explanation has been given to the instructor for the student's failure to complete the required work of the course. An "incomplete" cannot be made up after the lapse of one calendar year except by written permission of the Dean's Council. An incomplete which is not removed within one calendar year is automatically changed to an *F*. An incomplete cannot be removed by reregistering for the course.

REQUIRED COURSES IN ADMINISTRATION (Certain Fields)

The following courses in general administrative theory and practice are *required* of all candidates for the degree of Master of Business Administration and Master of Public Administration. They are also required of candidates for the degree of Master of Arts in Government in the field of Personnel Management.

		Semester Hours
Mgt 201:	Advanced Administrative Management	3
Mgt 204:	Quantitative Factors in Administration	3
Mgt 207:	Human Behavior in Organizations	3

In addition, each student is normally required to take, from the following group, the course appropriate to his specific area of concentration:

		Semester Hours
Acct 276:	Management Planning and Control	3
B Ad 257:	Operation of the Multinational Firm	3
B Ad 297:	Case Studies in Business Administration	3
HCA 206:	Case Studies in Health Care Administration	3
P Ad 260:	Seminar: Policy Formulation and Administration	3

THE THESIS

The thesis subject should be selected as early as possible so as to permit effective integration with the course work.

The subject must be approved by the professor in charge of the student's field. The thesis in its final form must have the approval of the professor in charge and must be presented to the Dean by the student no later than the date announced in the calendar. Printed copies of detailed regulations regarding the form and reproduction of the thesis are available in the Office of the Dean.

Payment of tuition for the thesis entitles the candidate, during the two semesters he registers for thesis (299 300), to the advice and direction of the member of the Faculty under whom the thesis is to be written. In case a thesis is unfinished, an additional successive academic year is granted without further tuition payment. The student must, however, maintain continuous registration during this period. If the preparation of the thesis extends more than three semesters beyond the date he registers for thesis 300, the student must register for the entire 6 hours of thesis again and pay tuition as for a repeated course.

MASTER OF BUSINESS ADMINISTRATION

Curricula leading to the professional degree of Master of Business Administration incorporate the recognized common core of instruction in business administration, the required courses in administration (see page 141), and an elective field of concentration planned in consultation with a faculty adviser. Elective fields normally comprise 9 to 15 semester hours of an individual student's program.

An applicant must have a Bachelor's degree from an accredited college or university.

The degree is awarded by vote of the Faculty upon satisfactory passing of the Master's Comprehensive Examination, and the submission of an acceptable

thesis. The complete program consists of 60 semester hours, 54 hours of course work and 6 of thesis. A student who has completed an undergraduate major in accounting or in business administration with a good record *may qualify* under a minimum acceptable program of 30 hours, including the thesis. No more than 6 hours of graduate course credits can be transferred from other accredited institutions, and each transfer of credit must be approved by the Dean.

The Master's Comprehensive Examination may not be taken before the last semester of course work.

FIELDS OF CONCENTRATION

ACCOUNTING

The field of concentration in Accounting is designed to provide a contemporary, broad-based academic preparation which will apply equally to the fields of accounting in government, industry, and public practice as well as to the field of general administration employing accounting as an effective means of understanding the organization.

A common body of knowledge in business administration is required of all candidates in this program. This knowledge may be obtained as part of an undergraduate degree in business or as a part of the total Master of Business Administration program.

BEHAVIORAL FACTORS IN ADMINISTRATION

The curriculum in this program reflects the assumption that the effective utilization of the behavioral sciences is concerned with both means and ends; that the specialist in behavioral science is not only skilled in theory and research but also applies his technical and specialized knowledge as a conscious force in effective organizational growth and improvement. Thus, courses are designed to equip the student with organizational concepts and behavioral skills appropriate to optimizing the utilization of a system's total resources.

This program is designed to fulfill the need for professionals capable of designing, creating, and developing the necessary behavioral and organizational systems appropriate to rapidly changing societies. Emphasis is on the interrelationships of such dimensions as motivation, leadership, problem-solving, organizational growth, and increased complexity of modern organizations and their effect upon the functions of organizational development.

BUSINESS-GOVERNMENT RELATIONS

This field of concentration provides a knowledge and understanding of the total business environment essential to business policy formulation and execution; gives a keener appreciation of the role and function of business in a free enterprise society, its environmental needs for optimum effectiveness, and what government can and should contribute to that environment; familiarizes students with successful techniques by which the content and direction of public policy toward business can legally be influenced; and provides students with a thorough knowledge of current government policies toward business, contemporary issues affecting government-business relations, and possible solutions to problems in this area.

This field serves the needs of students of the business environment at the Master's and Doctoral levels and is based on the premise that the enormous influence of government on business and vice versa—exercised in the roles of regulator, customer, supplier, protector, and competitor—will become even more pervasive and that business policy formulation and execution and business decision-making will become increasingly dependent upon thorough knowledge and understanding of the total environment of business and, most importantly, of government policies, programs, and laws affecting business.

DATA PROCESSING

The field of concentration in Data Processing provides a broad understanding of the principles of manual, mechanical, and electronic data processing, including computer programming concepts, methods, and languages; an appreciation of the capabilities and the limitations of data processing equipment; a knowledge of the phases of management information systems development; and an understanding of management's role in data processing. It provides an appreciation of the role of data processing as a tool of management.

FINANCE AND INVESTMENTS

The field of concentration in Finance and Investments prepares students for careers in finance and investments, providing a background in business budgeting, controllership, treasury, long-range planning, reporting, and financial management processes. Courses are designed to emphasize the planning, analysis, implementation, and controls necessary for making effective financial decisions. Instruction not only applies to manufacturing and trading enterprise but, in addition, includes railroad and public utility financing. Each, however, has distinctive operating features. Most financial dogmas have a universality that cuts across business lines, and variations are more a matter of degree than a form of substantive difference.

HEALTH CARE ADMINISTRATION

The programs in Health Care Administration lead to the degrees of Master of Arts in Health Care Administration, Master of Business Administration, and Master of Public Administration. The majority of students begin their studies in the fall semester of each year. However, a limited number of qualified students may be admitted to begin their course work in the spring semester and summer sessions. The basic curriculum for the degree of Master of Arts in Health Care Administration is developed in keeping with the background and professional goals of each student and ordinarily consists of a minimum of 48 semester hours. The basic curriculum for the Health Care Administration concentration leading to the degrees of Master of Business Administration or Master of Public Administration ordinarily consists of a minimum of 48 semester hours. Undergraduate courses in Accounting, Economics, and Statistics are required as a prerequisite for all of these degree programs. Master of Business Administration degree candidates must also complete selected required foundation courses.*

* Required foundation courses for Master of Business Administration degree candidates include Commercial Law, Marketing, Finance, Production, and Mathematics (calculus to the first variable).

Ordinarily full-time students can expect to complete the on-campus phase of the degree program in two to four semesters over a period of one to two academic years. The total time depends on past academic course work and experience in the health care field.

Hospital Administration.—The program in Hospital Administration is divided into two phases. During the first phase the student must complete a satisfactory academic program of course work, selected in accordance with his background and needs. These courses cover the general and technical background of hospital administration, general administrative theory and practice, and problem-solving in the area of management as it relates to short-term hospitals. The second phase is a period of either on-the-job residency* under qualified administrative supervision or supervised field experience, for which the student receives up to 9 semester hours of academic credit. A written major report is required as part of phase two. The length of the residency is dependent upon the area of concentration and the individual student's needs.

Administration of Long-term Care Facilities.—The concentration in Administration of Long-term Care Facilities is designed to prepare students for the administration of facilities for the aged, extended-care facilities, and mental hospitals.

During the first phase the student must complete a satisfactory academic program of course work, selected in accordance with his background and needs. These courses cover the general technical background of hospital administration, general administrative theory and practice, and problem-solving in the management of long-term care facilities. The second phase is a period of either on-the-job residency* under a qualified administrative supervisor or supervised field experience, for which the student receives up to 9 semester hours of academic credit. A written major report is required as part of phase two. The length of the residency is dependent upon the area of concentration and the individual student's needs.

Health Information Systems.—The concentration in Health Information Systems recognizes the rapidly growing demand for individuals who can develop and implement the use of computer-based information systems in decision-making approaches. It is designed to prepare those who wish to supervise and coordinate data collection, processing, and retrievable activities for health care complexes.

During the first phase the student must complete a satisfactory academic program of course work, selected in accordance with his background and needs. These courses cover the general and technical background of hospital administration and general administrative theory and practice. In addition required courses in computer services and information handling must be included. The second phase consists of supervised field experience. A written major report is required as part of phase two.

INTERNATIONAL BUSINESS

The field of concentration in International Business is designed to prepare students for careers in firms operating on a multinational basis or about to enter the international field; for careers in the federal government and in international agencies concerned with business, industry, and finance abroad; and for the Commerce option of the Foreign Service Officer Examination.

* In selected cases, a combined residency can be arranged in more than a single concentration.

This program is also designed to provide foreign students with the background and skills necessary to promote international business, and to prepare them for careers in foreign and domestic firms within their own countries and for commercial officer positions within their governments.

Each student's program is individually developed by the student's adviser according to the student's background and interests.

MANAGERIAL ECONOMICS

The field of concentration in Managerial Economics is the study of economic institutions and analytical methods, taken from the point of view of business or governmental management. Its purpose is to develop (1) a broad understanding of the tools of economics; (2) an analytical power with respect to various facets of an organization's activity or multi-organizational areas of special interest; (3) a skill in problem-oriented applications of economic tools; (4) an ability to interpret historical development and predict future trends in firms, industries, and economies; (5) a familiarity with the institutional setting of economic activity; and (6) an appreciation of the economic reasoning behind public policies.

With a strong orientation to the economic problems of organizations, this field of concentration is based on the methodology of general economics, which it supplements with the methods of management science.

Managerial economics presumes skills in quantitative methods, statistics, and intermediate-level general economics. It is offered in a sequence that commences with courses based on microeconomic and macroeconomic tools respectively, which can be taken in either order but must be preceded by the prerequisite courses. The third course in the sequence is a seminar which must follow the first two.

MARKETING

The field of concentration in Marketing encompasses all phases of supply and demand, from procurement and materials handling to product presentation and distribution. A student may concentrate in several subfields: marketing research, sales management, advertising, retailing, and international marketing. In addition, study may be complemented with courses from fields such as anthropology, geography, journalism, mathematics, psychology, sociology, and others.

OPERATIONS RESEARCH AND SYSTEMS ANALYSIS

The field of concentration in Operations Research and Systems Analysis develops a thorough understanding of quantitative or mathematical approaches to problems of managerial control and decision-making. While the program will develop a competent background in basic mathematical theory associated with the various techniques, it is oriented towards applications of the techniques rather than their theoretical mathematical content.

PERSONNEL MANAGEMENT

Personnel Management is concerned with all aspects of the employment of human resources in business organizations. It is a challenging field—dynamic and rapidly growing in scope and importance. Career opportunities are open in

domestic and international business organizations, hospitals, trade associations, research and educational institutions, and local, state, and federal government agencies. Courses encompass all phases of the recruitment, selection, employment, and development of people, industrial relations, unionism, collective bargaining, labor relations, and manpower utilization.

PROCUREMENT AND CONTRACTING

The field of concentration in Procurement and Contracting reponds to the recognized need for greater professionalism and sophistication among those engaged in procurement activities of the federal government and in contracting activities of vendors to the federal government.

The sustained increase in federal purchasing—in volume, variety, and complexity—places ever greater demands upon the skill and resourcefulness of procurement and contracting personnel. The field has therefore been designed with the following objectives: (1) to provide a broad professional education in the knowledge and skills necessary for success in this field; (2) to develop in the student increased ability in analysis, decision-making, and communication; (3) to increase the student's appreciation of the economic, social, legal, and technological considerations present in procurement and contracting activity.

RESEARCH AND DEVELOPMENT: POLICY AND MANAGEMENT

The field of concentration in Research and Development: Policy and Management explores the many aspects of technology relating to and influencing research and development management, business, and public policy. The employment of "state-of-the-art" technology and the creation of new technology through research and development are important processes in the achievement of the objectives of both private firms and governments.

The research and development environment has many unique operational characteristics. The program of graduate study in this concentration has been designed to identify and study the problems associated with managing creative professional people in a dynamic technology. As a contextual area, the program stresses the need for students to undertake original and meaningful research involving political, economic, sociological, and operational problems encountered by management in industrial, governmental, and military research and development organizations.

TRANSPORTATION

The field of concentration in Transportation is concerned with both private and public planning and the management of a viable transport system which will best serve the needs of the nation and its industries within a competitive framework. It is an integral function of all levels of government as well as of every unit of industry throughout the nation.

MASTER OF PUBLIC ADMINISTRATION

Curricula leading to the professional degree of Master of Public Administration are available in the fields of Health Care Administration, Personnel Management, Public Administration, and Urban and Regional Planning.

PUBLIC ADMINISTRATION

This program provides a course of study appropriate for those students currently in government or with appreciable past experience in government, or those with other than an undergraduate social science degree. The degree of Master of Public Administration is a professional degree, preparing graduates for positions of higher responsibility in the public service and generally improving their competence in public employment. Work done for this degree may lead directly toward the degree of Doctor of Public Administration.

The degree is awarded by vote of the Faculty upon satisfactory passing of the Master's Comprehensive Examination and the submission of an acceptable thesis. The academic program ranges from 36 to 60 semester hours, depending upon the background and experience of each student. Six semester hours in the program represent major research and preparation of a thesis. Students who have strong undergraduate backgrounds in political science, history, economics, business administration, sociology, or psychology, or who have had appropriate career experience closely related to such fields, will ordinarily require a minimum amount of course work to qualify for the degree. Each student develops an individual program in consultation with his faculty adviser to prepare for the Master's Comprehensive Examination.

No more than 6 hours of graduate credit can be transferred from other accredited institutions, and any transfer of credit must be approved by the Dean.

The course work for the degree of Master of Public Administration must include the *required* courses in administration (page 141). Other courses are selected, with the approval of the adviser, to prepare the student for the Master's Comprehensive Examination, which covers three fields of study. The field of administrative theory and practice is required of all students. The other two fields may be chosen from administration in the federal government, comparative and development administration, data processing and systems management, government-business relations, health care administration, human behavior in organizations, international administration and trade, metropolitan administration and urban affairs, public financial management and budgeting, public personnel administration, regional planning, urban planning and design, research and development policy and management, and closely related management and social science fields.

A thesis, which may be a major case study, is prepared under the guidance of an approved director.

HEALTH CARE ADMINISTRATION

The programs in Health Care Administration are described on pages 143–44, and lead to the degree of Master of Arts in Health Care Administration, Master of Business Administration, or Master of Public Administration.

PERSONNEL MANAGEMENT

The program in Personnel Management leads to the degree of Master of Public Administration (if elective emphasis is directed toward Public Administration), to the degree of Master of Business Administration (if elective emphasis is directed toward Business Administration), or to the degree of Master of Arts in Government.

The course work must include the *required* courses in administration, page 141, and the thesis (P Ad 299–300 or B Ad 299–300). Each individual student's program is arranged in consultation with a curriculum adviser.

URBAN AND REGIONAL PLANNING

The program in Urban and Regional Planning is designed to provide an introduction to planning theory and methodology for students who are working toward the degree of Master of Public Administration. The standards for the program are similar to those for the Public Administration curriculum outlined on page 147. The student is expected to include public administration, federal or metropolitan, as an integral part of his studies. With the counseling of an adviser, each program is individually planned in accordance with the interest and goal of the student.

MASTER OF URBAN AND REGIONAL PLANNING

The program of graduate study in Urban and Regional Planning leads to the professional planning degree of Master of Urban and Regional Planning. It is designed as preparation for careers on the municipal, county, state, and national levels, and for private professional practice. The course of study is designed to provide a broad professional education, to develop competence in planning and methodology, and to emphasize the analytical ability and creativity necessary for solving urban and regional problems. Each student's program is designed in consultation with an assigned faculty adviser in accordance with his individual career plans.

The degree is awarded by vote of the Faculty after satisfactory completion of (1) from 45 to 60 semester hours of course work, depending upon the background and experience of each individual student, including a thesis equivalent to 6 semester hours (most students will ordinarily be required to take 60 semester hours); (2) a minimum of three months' full-time professional training in a planning agency under qualified supervision, with an acceptable written report to be submitted after completion of the training period; (3) a written Master's Comprehensive Examination; and (4) a thesis based on the candidate's research in the field of urban and regional planning.

MASTER OF ARTS IN GOVERNMENT

Curricula leading to the degree of Master of Arts in Government are available in the fields of Personnel Management, Public Administration, and Urban and Regional Planning.

The programs leading to this degree require a minimum of 36 semester hours of work, which includes a thesis equivalent to 6 semester hours.

Second-group courses (numbered 101–200) may be counted toward the Master's degree up to a maximum of 12 hours, but only when registration for graduate credit has been approved at the beginning of the course by the faculty adviser and instructor. No work counted toward a Bachelor's degree may also be counted toward a Master's degree.

PERSONNEL MANAGEMENT

The program in Personnel Management leads to the degree of Master of Arts in Government, to the degree of Master of Business Administration (if elective emphasis is directed toward Business Administration), or to the degree of Master of Public Administration (if elective emphasis is directed toward Public Administration).

The course work must include the *required* courses in administration, page 141, and the thesis (B Ad 299–300 or P Ad 299–300). Each individual student's program is arranged in consultation with a curriculum adviser.

PUBLIC ADMINISTRATION

The program, in contrast to the professional program leading to the degree of Master of Public Administration (see page 147) is designed for students who wish to emphasize the academic elements of public administration. It may also serve as a basis for later study toward the doctoral degree. It is a suitable degree objective for students who have just completed the Bachelor's degree.

Each student is expected to prepare himself for a Master's Comprehensive Examination, which covers three fields. The field of administration and policy formulation in government is required. The other two may be selected from such fields as comparative and developmental administration, data processing and systems management, government-business relations, human behavior in organizations, international administration and trade, metropolitan administration and urban affairs, public financial management and budgeting, public personnel administration, regional planning, and urban planning and design. Related studies may be selected from accounting, economics, geography, history, political science, psychology, and sociology.

The course work is planned with an adviser.

URBAN AND REGIONAL PLANNING

The program in Urban and Regional Planning leading to the degree of Master of Arts in Government is designed to provide planning theory and methodology for students who have an undergraduate degree in the social sciences. The student is expected to include public administration, federal or metropolitan, as an integral part of his studies, as well as courses in urban planning and design or regional planning. Under the counseling of an adviser, each program is individually planned in accordance with the interest and goal of the student.

MASTER OF ARTS IN HEALTH CARE ADMINISTRATION

Curricula leading to the degree of Master of Arts in Health Care Administration are available with concentrations in Hospital Administration, Administra-

tion of Long-term Care Facilities, Health Information Systems, and Comprehensive Health Planning.

HOSPITAL ADMINISTRATION

The concentration in Hospital Administration is described on page 144, and leads to the degree of Master of Arts in Health Care Administration, Master of Business Administration, or Master of Public Administration.

ADMINISTRATION OF LONG-TERM CARE FACILITIES

The concentration in Administration of Long-term Care Facilities is described on page 144, and leads to the degree of Master of Arts in Health Care Administration, Master of Business Administration, or Master of Public Administration.

HEALTH INFORMATION SYSTEMS

The concentration in Health Information Systems is described on page 144, and leads to the degree of Master of Arts in Health Care Administration, Master of Business Administration, or Master of Public Administration.

COMPREHENSIVE HEALTH PLANNING

The concentration in Comprehensive Health Planning leads to the degree of Master of Arts in Health Care Administration. This program is designed to prepare students to plan for and coordinate all aspects of private and public health care systems in accordance with sound management principles. It is an interdisciplinary program which includes course offerings in the areas of environmental health, medical care organization, sociology, and urban and regional planning.

The first phase of the program consists of the required courses in health care administration, plus required courses in comprehensive health planning. The second phase consists of supervised field experience. A written major report is required as part of phase two.

Post-Master's Graduate Certificate in Health Care Administration

STUDENTS WITH APPROVED MASTER'S DEGREES from accredited institutions may take a special Post-Master's program leading to a Post-Master's Graduate Certificate in Health Care Administration. Each program will be planned to meet the professional needs of the individual student, whether he wishes to undertake a new field of study or to amplify his knowledge of work done at the Master's level.

This program permits study in depth of such areas as health care administration consulting; comprehensive health planning; government health care administration at federal, state, and county levels; long-term care administration, including mental hospitals, nursing homes, and facilities for the aged; and health care administration research.

Prerequisite: a Master's degree from an accredited college or university and an academic average which indicates the ability to undertake advanced study. The applicant is also judged on his experience, character, and personality. Applicants lacking formal study in health care administration are required to take qualifying courses.

REQUIREMENTS FOR THE CERTIFICATE

Students with adequate preparation in the health care field can complete the requirements with a minimum of 18 semester hours of approved graduate study. Those lacking such specialized study or equivalent experience will usually need to complete a minimum of 30 semester hours. At the discretion of the student's advisory committee a maximum of 6 semester hours may be transferred from another accredited institution if the work was taken for credit toward a graduate degree.

PROGRAM OF STUDIES

HCA 270 *Research in Health Care Administration* is required of all candidates for the Certificate. The remaining courses consist of a program of study worked out in consultation with a faculty adviser and planned with consideration of the student's experience and educational background and his specific professional objectives.

Doctoral Study

WORK FOR THE DEGREES of Doctor of Business Administration and Doctor of Public Administration is under the supervision of the Committee on Doctoral Studies.

ADMISSION

Completed application forms must be sent to the Office of the Admissions Officer, School of Government and Business Administration, George Washington University, Washington, D.C. 20006. The applicant should ask three individuals, who are acquainted with his ability to do high-level academic work, to write directly to the Chairman of the Committee on Doctoral Studies. These letters of reference should be on special forms which will be provided by the Committee Chairman. Applicants for the degree of Doctor of Business Administration must file results of the Admission Test for Graduate Study in Business with the Office of the Admissions Officer before final approval of their applications can be given. Applicants for the degree of Doctor of Public Administration must submit results of either the Admission Test for Graduate Study in Business *or* the Graduate Record Examination to the Office of the Admissions Officer. These tests must have been taken within the past five years. Arrangements to take these tests must be made with the Educational Testing Service, 20 Nassau Street, Princeton, N.J. 08540; or 1947 Center Street, Berkeley, Calif. 94704.

An applicant must have a degree of Master of Business Administration or Master of Public Administration, as appropriate; or a Master of Arts degree in

an approved field; or the equivalent, together with acceptable personal qualities and a capacity for creative scholarship. Each applicant must demonstrate his competence by qualifying examinations.

PLAN OF STUDY

The Chairman of the Committee on Doctoral Studies, in consultation with the applicant, will (1) designate fields of study selected from such areas as Accounting, Business Administration, Economics, Health Care Administration, International Business, Public Administration, Political Science, and Urban and Regional Planning; and (2) appoint an adviser to guide the student in his work in these fields. Most students will complete, prior to the General Examination, a minimum of 30 semester hours in graduate courses and such additional course work as may be prescribed by the adviser; but, the exact content of each program is determined in light of the student's background and competence after consultation with the appropriate faculty member in each of the fields undertaken.

Full-time students are normally expected to register for 9 to 12 semester hours each semester. All work for the Doctor's degree must be completed in five years unless an extension of time is granted by the Committee on Doctoral Studies prior to the expiration of the time limit. All course work must be taken on campus unless otherwise approved in advance by the Dean.

When the applicant has satisfied his adviser and the Committee of his readiness to take the General Examination in the fields of study previously designated, the examination will be scheduled during the following February or October.

Upon successful completion of the General Examination and approval of the subject of the doctoral dissertation, the student may be admitted to candidacy by the Committee on Doctoral Studies. The candidate's research and the preparation of his dissertation are supervised by a Research Adviser designated by the Committee.

After admission to candidacy, the student must register for 24 hours of *Dissertation Research* (399). Full-time students must register for 9 to 12 hours a semester for 2 semesters, and for sufficient hours in the third semester to complete the 24-hour requirement. Part-time students must register for 6 semester hours a semester for 4 semesters. If the dissertation has not been completed during the time the student has registered for the required 24 hours, he must register for 3 semester hours of *Dissertation Research* (399) each succeeding semester until the satisfactory completion of the dissertation and the final oral examination.

THE DISSERTATION

A dissertation is required as evidence of ability to perform scholarly research and to interpret and present its results.

No later than the date specified in the calendar the candidate must submit to the Dean three complete copies of the dissertation and an original copy of an abstract of his dissertation for inclusion in the Announcement of the Final Examination and for reproduction by University Microfilms, Inc.

Printed copies of detailed regulations regarding the form and reproduction of the dissertation, preparation of the abstract, and services offered by University Microfilms, Inc., are available in the Office of the Dean. The successful candi-

date for the doctorate is required, before receiving his degree, to pay a fee to cover the expense of printing the abstract of his dissertation, and for the basic service rendered by University Microfilms, Inc.

THE FINAL EXAMINATION

The Final Examination of the candidate consists of his oral defense of the dissertation. The Examination will be given by a committee appointed by the Committee on Doctoral Studies. Upon successful completion of this oral examination the candidate will be approved for the degree of Doctor of Business Administration or Doctor of Public Administration by the Committee on Doctoral Studies.

RESIDENCE

The Committee on Doctoral Studies expects all students to remain registered until *all* degree requirements are satisfied, although there is no formal regulation concerning the minimum amount of time of study either in preparation for the General Examination or as a doctoral candidate engaged in research. The student who undertakes either part of the doctoral program on a full or limited schedule must maintain "continuous registration" under the School of Government and Business Administration even when he is granted a leave of absence for study or residence elsewhere. By failing to register for one semester or more, the student breaks his registration and must apply for readmission to the School under whatever new conditions and regulations are set up by the Committee or the member of the Faculty who directs his research. The student who has completed his tuition requirements, but whose graduation is deferred for any reason, must maintain continuous registration by paying the continuous registration fee for the semester immediately preceding the graduation at which he expects to receive his degree.

Special Programs

GOVERNMENT MANAGEMENT INTERN SCHOLARSHIP PROGRAM

THE GOVERNMENT MANAGEMENT INTERN SCHOLARSHIP PROGRAM offers annually fifty scholarships to assist federal agencies in training carefully selected young men and women for administrative leadership in government career service. Each scholarship provides a tuition-free course of 3 semester hours a semester, and interns who maintain satisfactory standing in both their academic program and their government training program may qualify for extension of the scholarship for one additional semester.

NAVY GRADUATE FINANCIAL MANAGEMENT PROGRAM

The Navy Graduate Financial Management Program, sponsored by the Naval Postgraduate School, provides 50 semester hours of work in financial management and related fields for a selected group of Naval and Marine officers. The

Master of Business Administration degree is awarded upon successful completion of this full-year program.

CONTINUING EDUCATION IN HEALTH CARE ADMINISTRATION

A nondegree program is conducted in the various areas of health care administration both on campus and off campus whenever a sufficiently large class is organized. Institutes, workshops, and lecture series are conducted under the auspices of program faculty and selected leaders from local, state, and regional areas on topics of current interest to the requesting organization. No specific prerequisite is required. Fees are to be announced.

THE INTERNATIONAL INSTITUTE FOR HEALTH CARE ADMINISTRATION

In recognition of special educational needs of students from other countries, The International Institute for Health Care Administration offers programs of instruction designed to meet these needs at either the degree or certificate level.

It is also equipped to enter into arrangements with principals of hospital systems in world-wide areas to assist in the preparation of teaching programs or the actual instruction of administrative personnel either abroad or at the University.

THE MANAGEMENT RESEARCH GROUP

The Management Research Group seeks to serve government, industry, and commerce by contributing to the development and understanding of basic theory in the field of management. The Group also provides assistance in translating theory into practice.

Relationships and techniques important to modern information flow and managerial decision-making are stressed. The research conducted extends to system design, analysis of system performance, and the evaluation of practice in relation to managerial criteria.

CERTIFICATION OF PUBLIC PURCHASING AGENTS

The School of Government and Business Administration participates in the National Institute of Governmental Purchasing professional certification program. Courses and examinations leading to qualification as "Certified Public Purchasing Officer" (CPPO) are provided. Inquiries may be directed to the School or to the National Institute of Governmental Purchasing, 1001 Connecticut Avenue, N.W., Washington, D.C. 20036.

OFF-CAMPUS DEGREE PROGRAMS

The School of Government and Business Administration has academic jurisdiction over off-campus programs leading to the following degrees: Bachelor of Science in Administration with concentrations in accounting and business administration and the Master of Science in Administration.

These degree programs are administered by the College of General Studies. For details concerning the off-campus programs see the *College of General Studies* Catalogue.

SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS

Dean B.M. Sapin

FACULTY*

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F.H. Michael *(Chairman)*, C.F. Elliott, Andrew Gyorgy, W.R. Johnson, J.A. Morgan, Jr.

*The President of the University, the Vice President for Academic Affairs, the Registrar of the University, the Director of Admissions of the University, and the Director of Libraries of the University are ex officio members of the Faculty of the School of Public and International Affairs.
†The Dean of the School is an ex officio member of all committees.

COMMITTEE ON CHINESE STUDIES

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COMMITTEE ON SCIENCE, TECHNOLOGY, AND PUBLIC POLICY STUDIES

C.E. Galbreath, Andrew Gyorgy, John Hanessian, Jr., J.M. Logsdon, J.K. McDonald, Benjamin Nimer

INTRODUCTION

With the establishment, in 1898, of the School of Comparative Jurisprudence and Diplomacy, the study of Government was first organized as a separate entity in the University. In 1928, this School was reorganized and broadened as the School of Government. During the next two decades, programs in business administration and public administration were added, and the emphasis gradually shifted from undergraduate to graduate study. The name was changed in 1960 to the School of Government, Business, and International Affairs to reflect more accurately the offerings of the School. A division of the School was effected in 1966, and two schools were established—the School of Government and Business Administration, a primarily professionally-oriented school, and the School of Public and International Affairs, a primarily policy-oriented school.

Programs of the School of Public and International Affairs are interdisciplinary, and emphasize governmental policy, both domestic and foreign.

Students in the freshman and sophomore years are registered in the lower division of Columbian College of Arts and Sciences, the liberal arts college of the University. Here they are assigned special advisers from this School to assist them in planning their programs.

ACADEMIC PROGRAMS

Programs available within the School of Public and International Affairs are an undergraduate field in Chinese Studies, undergraduate and graduate fields in International Affairs and Public Affairs, and graduate fields in Russian Studies and in Science, Technology, and Public Policy. Special programs in Soviet, Chinese, and East European studies are offered by the School's Institute for Sino-Soviet Studies.

OBJECTIVES

Each of the three undergraduate programs of study is aimed at preparing the student to understand major contemporary issues in international affairs or in domestic public affairs. The programs are designed not to produce narrow professional specialists, but to foster a liberal education, interdisciplinary in nature and broader than a concentration in one of the conventional disciplines.

In each program there is a double effort: to develop a background as broad and as deep as possible in order to assist in the understanding and analysis of modern problems, and to give instruction in some useful tools of analysis.

The graduate programs leading to the degree of Master of Arts are more concentrated. The student is expected to develop a greater competence in an area or a discipline, building on his undergraduate program in preparation for professional employment in government, in international organizations, in business, or in private agencies concerned with public or international affairs.

REGULATIONS

Regulations concerning ADMISSION, REGISTRATION, FEES AND FINANCES *are stated on pages 23–33; other University regulations, on pages 44–52.*

ATTENDANCE

A student may not attend classes until registration is completed and fees due are paid. A student may be dropped from any course for undue absence.

The student is held responsible for all the work of the courses in which he is registered, and all absences must be excused by the instructor in charge before provision is made for him to make up the work missed.

A student suspended for any cause may not attend classes during the period of suspension.

WITHDRAWAL

Withdrawal after the end of the fifth week of classes (fall or spring semester) without academic penalty is permitted only in exceptional cases (see "Withdrawal," page 46).

The Degree of Bachelor of Arts

THE SCHOOL OFFERS PROGRAMS leading to the degree of Bachelor of Arts in the fields of Chinese Studies, International Affairs, and Public Affairs.

ENTRANCE REQUIREMENTS

The satisfactory completion of the *Chinese Studies and International Affairs*, or *Public Affairs* curriculum in the lower division of Columbian College of Arts and Sciences (see page 80), or the equivalent, is required.

REQUIREMENTS FOR THE DEGREE

ACADEMIC WORK LOAD

A full-time student not on probation may not ordinarily take more than 15 semester hours. A student employed more than 24 hours a week who is not on probation may not take more than 9 semester hours.

A full-time student with Honors grades, or higher, in 60 per cent of his course work may not take more than 18 semester hours. A student employed more than 24 hours a week who has Honors grades in 60 per cent of his course work may take up to 12 semester hours.

A student who accepts employment after registration or at any time during a semester must report immediately to the Dean, so that his program may be adjusted if necessary.

Exception to these rules will require the approval of the Dean.

SCHOLARSHIP

In order to graduate, a student must have the following: (1) 124 semester hours of passing grades and (2) High Pass or Honors grades in half the courses taken in the major. The major includes the required courses and courses taken in the group options.

DEAN'S HONOR LIST

The name of every student who achieves Honors grades in at least 60 per cent of his course work is placed on the Dean's Honor List for that semester. Appearance on the List will be limited to (1) full-time students registered for a minimum of 12 semester hours and (2) part-time students registered for a minimum of 12 semester hours over a period of two consecutive semesters, which may include a summer term.

ACADEMIC STANDING

A student who is not suspended or on probation is considered to be in good standing.

The following rules governing probation and suspension are applicable as stated to students enrolled for a full-time program (12 semester hours or more) during the fall or spring semester. Students enrolled for less than 12 semester hours during the fall or spring semester and students enrolled during the summer sessions are subject to probation or suspension on the basis of their record for 12 semester hours, or multiples thereof, rather than on their record in any one semester.

PROBATION

A student who in one semester receives two grades of Fail in courses carrying 3 or more semester hours of credit each, or the equivalent, is placed on probation. A student on probation who receives one grade of Fail in such a course will be continued on probation for a second semester. A student on probation taking 12 or more semester hours whose grades are all Pass or better is removed from probation.

SUSPENSION

A student who in one semester receives grades of Fail in three courses carrying 3 or more semester hours of credit each, or the equivalent, is suspended. A student on probation who receives two or more grades of Fail in such courses is suspended. A student who receives one or more grades of Fail in such courses in a second semester on probation is suspended.

A student who is suspended for poor scholarship may apply for readmission after the lapse of either the fall or spring semester. To be considered for readmission, he must pass prescribed tests and submit evidence to the Dean's Council that during his absence from the University he has so conducted himself as to indicate that he will profit by readmission. A student readmitted after suspension is on probation. In no case will the probationary period after readmission exceed 24 hours of study. A student suspended twice for poor scholarship will not be readmitted.

RESIDENCE

A minimum of 30 semester hours, including at least 12 hours in the major field, must be completed while registered in the School of Public and International Affairs. This requirement applies to students transferring within the University as well as to students transferring from other institutions. Summer work may be counted toward the residence requirement, but in no case may the period of residence aggregate less than thirty weeks. Unless special permission is granted by the Dean to pursue work elsewhere, the work of the senior or final year must be completed in the School of Public and International Affairs.

USE OF CORRECT ENGLISH

Any student whose written or spoken English in any course is unsatisfactory may be reported by the instructor to the Dean. The Dean may assign supplementary work, without academic credit, varying in amount with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition fee is charged. The granting of a degree may be delayed for failure to make up any such deficiency in English to the satisfaction of the Dean.

STUDY ABROAD

Students wishing to study abroad must consult with their advisers and the Dean, because arrangements must be made on an individual basis. Students should receive the Dean's approval, in advance, for their plan of study abroad if they plan to have the credits earned abroad apply to the degree program they are registered for in this School. A catalogue or other description of the foreign institution or study program should be presented for consideration together with detailed descriptions of the courses to be taken. Students of international affairs are encouraged to travel and study abroad.

CORRESPONDENCE AND HOME-STUDY COURSES

Credit for correspondence or home-study courses is not acceptable and cannot be applied toward a degree.

CURRICULUM REQUIREMENTS

To be recommended by the Faculty for graduation, candidates are required to complete, in addition to the appropriate freshman and sophomore work, a minimum of 60 semester hours during the junior and senior years, as set forth in one of the following curricula.

EXAMINATIONS FOR WAIVING CURRICULUM REQUIREMENTS

A required course may be waived by the satisfactory passing of a waiver examination authorized and prescribed by the department or curriculum adviser concerned. Passing this examination does not entitle the student to any hours of credit toward the degree. Request to take the examination should be made to the curriculum adviser and the required fee paid at the Office of the Cashier before the date set for the examination.

CHINESE STUDIES

The Chinese Studies program is designed to introduce the student to a non-Western culture and to provide an understanding of the history, politics, and economy of modern China. The program is interdepartmental and is recommended for students who wish a comprehensive study of one of the world's major civilizations and for those who contemplate graduate study in Chinese or Far Eastern Affairs.

All Chinese Studies majors must complete 24 semester hours of *required* courses and 36 semester hours (including electives) in one area of concentration selected from Economics, History, or Political Science (see pages 383–84).

INTERNATIONAL AFFAIRS

The International Affairs program covers international political relations, international economics, international communications, and regional studies. Its purposes are to provide an understanding of the forces operative in the contemporary world—political, economic, and social—and to give the student an awareness of major international problems and the role of the United States as a world power.

All International Affairs majors must complete 30 semester hours of required courses (see page 384), 15 hours to be selected in consultation with the adviser from one of the following group options, and 15 hours of electives.

Group I: International Politics.—Courses concerned with theory and practice in international affairs, forces shaping the world scene, and American foreign policy.

Group II: International Economics.—Courses concerned with the world economy and American policy and practice in international trade and finance.

Group III: International Communications.—Courses concerned with the study of international information programs, public opinion, psychological warfare, cultural relations, and public relations.

Group IV: Regional Study.—Integrated programs of study on Europe, Africa, the Middle East, the Far East, the Soviet Orbit, or Latin America.

PUBLIC AFFAIRS

The Public Affairs program is a composite curriculum dealing with domestic government and policy.

All Public Affairs majors must complete 30 semester hours of *required* courses, 12 hours in a group option—economics, politics, or urban affairs—and 18 hours of electives (see page 384).

The Degree of Master of Arts

THIS SCHOOL OFFERS PROGRAMS leading to the degree of Master of Arts in the fields of International Affairs; Public Affairs; Russian Studies; and Science, Technology, and Public Policy.

ADMISSION REQUIREMENTS

Application forms are available from the Graduate Admissions Office, School of Public and International Affairs, George Washington University, Washington, D.C. 20006.

A Bachelor's degree from an accredited college or university, with a *B* average or better, or the equivalent, in the relevant undergraduate field, is required. Graduate Record Examination scores and letters of recommendation are also taken into consideration.

In the field of International Affairs.—The applicant's undergraduate program should have included background courses corresponding to an undergraduate major in international affairs at this University.

In the field of Public Affairs.—An undergraduate major in public affairs, economics, history, or political science, depending on the field of specialization, is required.

In the field of Russian Studies.—An undergraduate major in a pertinent field is required. The undergraduate program should have included the following courses, or equivalent: Hist 145–46; P Sc 112 or 161; Slav 1–2 and 3–4, or 5–6.

In the field of Science, Technology, and Public Policy.—Undergraduate majors in a social, life, or physical science, or in engineering are eligible for admission, although those lacking adequate preparation in relevant social sciences may be required to take additional courses.

READMISSION

A graduate student who has not maintained continuous registration and has not registered for one or more semesters must file an application for readmission. Applications for readmission are reviewed by the Dean and the Committee on Admission.

GENERAL REQUIREMENTS

There are two options available for the Master of Arts degree. One requires a minimum of 24 semester hours of course work plus the successful completion of a thesis, which is equivalent to 6 additional semester hours. For the thesis work, the student must register for *Thesis Research* (299–300). The second option requires a minimum of 36 semester hours of course work without a thesis. Most individual student programs exceed the minimum required semester hours, dependent upon the undergraduate major and other prerequisites.

Master's degrees are awarded by vote of the Faculty after the student has completed the required course work and an acceptable thesis (if one is elected),

has satisfied the foreign language or tool requirement, and has passed the Master's Comprehensive Examination. An applicant whose background does not include the necessary courses or equivalent work experience must take a program longer than the minimum hours required.

Second-group courses (numbered 101–200) may be counted toward the Master's degree only when registration for graduate credit has been approved at the beginning of the course by the curriculum adviser and the Dean. Such approval is granted only with the provision that students must complete additional work in order to receive graduate credit. Normally, no more than 6 semester hours of 100-level courses may be taken for graduate credit. No work counted toward a Bachelor's degree may also be counted toward a Master's degree.

All work for a Master's degree must be completed in five years, unless an extension of time is granted by the Dean.

No credit is granted for work done *in absentia* or without formal instruction, except for the thesis, which may be completed *in absentia* with the permission of the curriculum adviser and the Dean. No more than 6 semester hours of graduate credit may be transferred from other accredited institutions or another division of the University, and these may be accepted only under limited conditions of time, grades, and relevance to the student's program.

A student who expects to continue his studies for the degree of Doctor of Philosophy in the field of International Relations after receiving the Master's degree in the field of International Affairs is strongly advised to plan from the beginning so that work for the lower degree will fit into a subsequent doctoral program in the Graduate School of Arts and Sciences (see pages 90–94, 96–98).

TOOL REQUIREMENTS

In most programs of study a candidate for the degree of Master of Arts must show that he has a reading knowledge (certified by the appropriate language department) of at least one modern foreign language, to be approved by the Dean. The language examination should be taken before the student begins the second 15 hours of his work. No student may take the examination more than three times.

Candidates in the field of Public Affairs and in the field of Science, Technology, and Public Policy may substitute statistics for a foreign language. Acceptable Statistics courses are Stat 49, 117, 118, and 121.

Candidates in the field of International Affairs may petition the Dean to substitute statistics for a foreign language. The primary basis for approving such petitions will be the relevance of the statistical skills to the student's thesis research.

MASTER'S COMPREHENSIVE EXAMINATION

In addition to any course examinations, the candidate must pass a written Master's Comprehensive Examination. Examinations are scheduled twice a year (usually in November and April), and should be taken during the last semester of course registration or shortly after the completion of the prescribed course work. If there is a lapse of time between completion of course work and the examination, the student must maintain "continuous registration" dur-

ing this period. The candidate must consult with his adviser, well in advance, as to the date of his examination and the definition of the subject-matter fields which this examination is to cover. An oral examination on his thesis or major report may also be required.

SCHOLARSHIP

Grades for graduate work are *A*, excellent; *B*, good; *C*, minimum pass; *F*, fail; *I*, incomplete; *W*, authorized withdrawal; and *CR*, credit.

An average of *B* or better is required for the Master's degree. The grade of *C* is not considered as failing but must be counter-balanced by a grade of *A* in a graduate course of equal status.

A Master's candidate who receives a grade of *F* is required to present cause for consideration by the Dean's Council as to why he should be allowed to continue his studies.

Whenever a grade has not been assigned, the symbol *I* (incomplete) or the symbol *W* (authorized withdrawal) will be recorded. The symbol *I* indicates that a satisfactory explanation has been given to the instructor for the student's failure to complete the required work of the course. An "incomplete" cannot be made up after the lapse of one calendar year except by written permission of the Dean's Council. An incomplete which is not removed within one calendar year is automatically changed to an *F*. An incomplete cannot be removed by reregistering for the course.

THE THESIS

The thesis subject should be selected as early as possible so as to permit effective integration with the course work.

The subject must be approved by the student's adviser and the member of the Faculty under whom the thesis is to be written. The thesis in its final form must have the approval of the thesis director and must be presented to the Dean by the student no later than the date announced in the calendar. Printed copies of detailed regulations regarding the form and reproduction of the thesis are available in the Office of the Dean.

Payment of tuition for the thesis entitles the candidate, during the period of registration, to the advice and direction of the thesis director. In case a thesis is unfinished, an additional calendar year may be granted without further tuition payment. The student must, however, maintain continuous registration (see page 48) during this period. If the preparation of the thesis extends beyond the additional calendar year, the student must register for the entire 6 hours of thesis again and pay tuition as for a repeated course.

INTERNATIONAL AFFAIRS

Prerequisite: the applicant's undergraduate program should normally include a broad background of courses corresponding to the interdepartmental undergraduate major in International Affairs at this University (see page 384), or some equivalent interdisciplinary social science program. In the case of major deficiencies in the social sciences or international relations, additional course work may be specified beyond the minimum requirements for the Mas-

ter's degree. The student's particular responsibilities will be indicated in his letter of admission to the program and in the course of subsequent consultation with a program adviser, who will be assigned and with whom the student is required to confer.

Students who elect the program of study which includes a thesis must complete 24 semester hours of third-group courses (numbered above 200) plus *Thesis Research* (299–300) which is equivalent to 6 additional semester hours. Students who elect the program of study without a thesis must complete 36 semester hours of third-group courses (numbered above 200). Under special circumstances, up to 6 semester hours of second-group courses (101–200) may be taken for graduate credit, but only if approval has been given by the program adviser and the Dean at the time of registration for the course, and by the course instructor. The student who takes an undergraduate course for graduate credit is expected, by arrangement with the instructor, to do work at the graduate level in addition to the regular work of the course.

In addition to the satisfactory completion of his courses and the thesis (if one is elected) the student must pass a set of written examinations over three fields (if a thesis is elected) or four fields (if a thesis is not elected) within the broad area of international affairs. The student will confer with his program adviser concerning the complete range of general, supplementary, and regional study from which his fields may be selected. These fields must represent at least two disciplines.

Graduate courses should be selected, in consultation with the adviser, with a view to their relevance to the fields in which the student expects to be examined. Course work should be understood to be only partial preparation for the field examinations, and the student is expected to pursue a program of additional reading in each of his fields, in accordance with the advice of the instructor responsible for instruction in the field.

The program in International Affairs offers three broad fields of study: general, supplementary or special, and regional. At least one general field must be included in the three fields the student selects. Graduate courses (numbered over 200) in anthropology, business administration, economics, history, political science, psychology, and sociology relate to these fields of specialization.

General Fields of Study.—International Politics, Comparative Government and Politics, Modern Political Theory (including Socialist and Communist Theory), and International Economics.

Supplementary or Special Fields.—International Law, International Organization and Administration, International Economic Development, International Communications, International and Comparative Aspects of Communism, U.S. Diplomatic History, and U.S. Foreign Policy.

Regional Fields.—Modern history, or government and politics, or economic history and problems of Western Europe, Eastern Europe, Soviet Union, Latin America, Middle East, Africa, South and Southeast Asia, and China.

Sino-Soviet Studies.—The Institute for Sino-Soviet Studies provides a program of interdisciplinary study concerned with the problems of Russia, the Soviet Union, East Asia, and Eastern Europe, and related aspects of international communism. Graduate studies under the auspices of the Institute are available to qualified students (see pages 307–12).

PUBLIC AFFAIRS

Prerequisite: an undergraduate major in public affairs, economics, history, or political science, depending upon the field of specialization. Any course deficiency in the undergraduate Public Affairs curriculum, as stated on page 384, must be made up.

The tool requirement (see page 162) must be satisfied.

The program in Public Affairs is offered in two fields of specialization: domestic economics and domestic politics.

Recommended for domestic economics: courses in economic development, economic policy, public finance, and national income.

Recommended for domestic politics: courses in U.S. social, constitutional, and political history; comparative government; political theory; the American Presidency; legislative organization; jurisprudence; political parties; and public opinion.

RUSSIAN STUDIES

Prerequisite: an undergraduate major in a pertinent field. The undergraduate program should have included appropriate courses in history, political science, and Russian language (see page 385).

The student's program of study is planned in consultation with an adviser, and the 24 semester hours (if a thesis is elected) or 36 semester hours (if a thesis is not elected) of course work (see page 385) include courses in economics, geography, history, or political science, and Russian culture or Soviet literature. The student must pass a general written examination. If he is writing a thesis (equivalent to 6 semester hours), it must be interdisciplinary in approach. The tool requirement must be satisfied by passing a reading knowledge examination (certified by the appropriate language department) in one foreign language, approved by the Dean.

SCIENCE, TECHNOLOGY, AND PUBLIC POLICY

Prerequisite: an undergraduate major in a social, life, or physical science, or in engineering. Those lacking adequate preparation in relevant social sciences may be required to take additional courses; such requirements will be indicated in the letter of admission to the program.

The student's program of study (see page 385) is flexible and is carefully planned and conducted in consultation with an adviser. The program will cover three (or four) fields of study. One will be the core field of science, technology, and public policy, with 9 hours of required courses. A second will be one of the fields currently offered in the international affairs or public affairs programs of the School. The third field (and, or fourth field) may also be chosen from a currently offered field, or one or both may be an interdisciplinary field developed in consultation with the adviser and drawing upon the total resources of the University in order to focus on a particular policy issue or area. Such a special field must be approved by the student's adviser and the Dean.

Each student must pass written comprehensive examinations in his fields of study. The language or statistics requirement (see page 162) must be satisfied.

Institute for Sino-Soviet Studies

GRADUATE STUDY AND RESEARCH ON EASTERN EUROPE, RUSSIA, THE SOVIET UNION, AND EAST ASIA

The Institute for Sino-Soviet Studies provides a program of specialized graduate study and research within the School of Public and International Affairs. Courses of the Institute are drawn from a variety of academic areas and thus provide an interdisciplinary approach to the study of Russia and the Soviet Union, Eastern Europe, and East Asia, and of the Communist movement within and among the countries of these areas. Faculty members conduct seminars and reading courses in the disciplines of economics, geography, history, language and literature, law, political science, and psychology.

The Institute provides Master's and Doctoral candidates with the opportunity to combine a course program of Sino-Soviet Studies with the work in their own disciplines.

Students who are preparing for the degree of Master of Arts in the field of International Affairs in the School of Public and International Affairs, or for the degree of Master of Arts in the field of economics, history, or political science in the Graduate School of Arts and Sciences, with a specialization in Sino-Soviet Studies, may take one-half of their course work from the Institute's program.

Students working toward the Degree of Doctor of Philosophy in International Relations with special emphasis on the Sino-Soviet Area are expected to combine work in the Institute with work in the fields of economics, history, and political science. Doctoral candidates in the field of political science are expected to combine two fields of specialization with three general fields in their discipline. Doctoral candidates in the field of history are expected to take at least two of the four fields of the degree in the history of the countries of their specialization. All work leading to the degree of Doctor of Philosophy is under the general supervision of the Graduate School of Arts and Sciences and Consultative Committees designated by it which direct the work of each graduate student upon admission to degree candidacy. A faculty member of the Institute will serve as adviser to the candidate. The candidate's committee will be formed from members of his disciplinary department. A candidate for such a degree should assume that his committee will require the substitution of a reading examination in Chinese or Russian for one of the two Western languages normally required for the degree.

RESEARCH

Research work is integrated with the teaching program. Members of the research program belong to different disciplines and include not only faculty but also selected graduate students. Research monographs are being published by the Institute.

A special brochure describing in more detail the work of the Institute is available upon request.

INTERUNIVERSITY RESEARCH COLLOQUIA

Scholars from George Washington University, American University, Howard University, the School of Advanced International Studies of Johns Hopkins

University, and the University of Maryland conduct two interuniversity research colloquia. The Colloquium on Modern China is under the chairmanship of Professor Franz Michael, Director of the Institute for Sino-Soviet Studies; the Colloquium on Russia and Eastern Europe is under the chairmanship of Professor Andrew Gyorgy. Research in progress by members of the colloquia and plans for future research are discussed at weekly meetings. Advanced graduate students can be admitted on approval of the chairman concerned. They receive 3 semester hours of academic credit for each semester of participation.

War College Programs

THE SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS offers off-campus programs at the National and the Naval War Colleges leading to the degree of Master of Science in International Affairs. Admission is limited to selected members of the faculty and student bodies of these two War Colleges.

The programs of study are complementary to those portions of the War Colleges' curricula pertaining especially to international relations and foreign policy.





DIVISION OF UNIVERSITY STUDENTS

Dean J.G. Allee, Jr.
Assistant Dean Jean Gladding

DEAN'S COUNCIL*

J.G. Boswell, A.H. Desmond, Hewitt Kenyon, J.A. Morgan, Jr.

INTRODUCTION

THE DIVISION OF UNIVERSITY STUDENTS was established in 1930 to make the regular course offerings of the University more generally available to members of this metropolitan community and to others who are not at the time candidates for degrees in this University. In this Division are registered students who wish to undertake university courses for credit or as auditors. University Students, often employed in government or industry, may be taking courses to increase their vocational fitness or to inform themselves on new developments in the arts and sciences. They may be taking courses as a matter of personal interest for cultural enrichment. Such students may be candidates for higher degrees in other institutions, sent here for special work as part of a graduate program. They may be undergraduates, matriculated in other colleges, taking summer sessions courses only or courses for transfer during the regular academic year with the approval of their own institution. To serve members of such groups and others not enrolled in degree-granting branches of the University is the function of the Division of University Students.

The privilege of attending George Washington University as a nondegree student is granted on the basis of maturity and proper preparation. Because no degree at George Washington University is involved, there can be no meaningful advisory system in the Division. However, students are invited to seek advice from academic departments. University students are urged to apply to the Office of Admissions for transfer to degree-granting branches whenever such action is appropriate.

All courses except those restricted to medical and law students and those limited to specific degree candidates are open to students in the Division of University Students. Students wishing to take Engineering and Applied Science courses should consult the *School of Engineering and Applied Science* Catalogue.

*The Vice President for Academic Affairs, the Dean and the Assistant Dean of the Division are ex officio members of the Council.

Registration in a given course may be denied students in this Division when space is needed for degree candidates.

An applicant who has been denied admission to any degree-granting branch of the University will not be considered for admission to the Division of University Students for the semester for which the applicant was denied, except upon written recommendation of the dean of the college or school that denied the applicant. However, an applicant who has been denied may be considered in subsequent semesters.

ENTRANCE REQUIREMENTS*

Good character and an academic background appropriate for the program of studies contemplated are required.

A person not working for a degree at this University will be considered for admission to the Division of University Students to take courses for which he has adequate preparation, as determined by the departments concerned.

Although the deadline for applications for admission to the Division of University Students is the Friday before the first day of registration (see pages 7, 8), applicants are urged to apply earlier because no special exceptions will be made to permit registration for credit after the last day for adding classes (see page 171) even though the requiring of credentials, records, and test scores may delay the action on an application for admission. Subject to the permission of the department concerned, the deadlines for late registration, adding, dropping, and withdrawal do not apply to auditors.

Scholastic records are required of

1. An applicant who has graduated from high school within the previous two calendar years. Such an applicant must pass designated aptitude tests or meet the following requirements, which are the same as those for admission to Columbian College of Arts and Sciences.

a) An acceptable certificate of graduation from an accredited secondary school, showing at least fifteen units† which must include four years of English; at least two years of one foreign language; two years of science, preferably with laboratory instruction; two years of social studies, one of which must be American history; and two years of college preparatory mathematics. It is to be noted that one unit of algebra, or the equivalent, is prerequisite to courses in chemistry and statistics, and that one unit in algebra and one unit in plane geometry, or the equivalent, are prerequisite to courses in mathematics and physics.

b) The principal's statement that the applicant is prepared to undertake college work.

c) College Entrance Examination Board scores on the Scholastic Aptitude Test and the English Composition Achievement Test.

2. An applicant who has been subject to any form of academic or disciplinary action at any college or university within the previous calendar year.

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* Foreign students, see pages 26–27.

† A unit represents a year's study in a secondary school subject, including in the aggregate not less than 120 sixty-minute periods, or the equivalent, of prepared classroom work.

3. High school students who are applying for the Secondary School Honors Program (see pages 172–73).

4. An applicant who has not completed high school or the equivalent. Such an applicant may be required to take assigned aptitude tests at the University Counseling Center.

Scholastic records may be required of

1. An applicant who has attended any college or university during the previous calendar year.

2. A former student of this University who was on probation or suspended and, since then, has attended another college or university.

3. An applicant who has *ever* been subject to academic or disciplinary action. When scholastic records are required, a student may be admitted for one semester or summer term only, pending receipt of records and under provisions stated by the Office of Admissions.

REGULATIONS

Regulations concerning ADMISSION, REGISTRATION, FEES AND FINANCES *are stated on pages 23–33; other University regulations, on pages 44–52.*

Prospective and registered students are urged to acquaint themselves with the regulations concerning "Attendance" (see page 44), and "Withdrawal" (see page 46).

The following specifically applies to all students in the Division of University Students:

Last day to add a class for credit—end of first week of classes.

Last day to drop a class for credit—end of fourth week of classes. (See calendar for beginning date of classes, pages 7, 8.)

Withdrawal from the University without academic penalty between October 15, 1971, and the end of the fall semester and between February 25, 1972, and the end of the spring semester is permitted only in exceptional cases.

ACADEMIC WORK LOAD

The normal academic work load is not more than 10 hours for a student employed more than 20 hours a week and not more than 17 hours for a full-time student. Exceptions to these limits must be approved by the Dean.

SCHOLARSHIP

A student who fails to maintain the scholarship requirements of this Division may be dismissed from the University.

Normally, any course may be repeated for credit. All grades received in the Division of University Students remain on the record, and scholarship requirements are based on the total record. A course taken for audit may not be repeated for credit (see page 47).

GRADES

Undergraduate.—See pages 44–45.

Graduate.—For graduate work, grades are indicated as *A*, Excellent; *B*, Good; *C*, Minimum Pass; *F*, Fail; *I*, Incomplete; *W*, Authorized Withdrawal.

The "credit no credit" option, which permits students to take courses in which they receive the grade of either "Credit" or "No Credit," is not available to students registered in the Division of University Students.

PROBATION AND SUSPENSION

A student taking courses for undergraduate credit is subject to the same "Probation" and "Suspension" regulations as those of Columbian College of Arts and Sciences (page 72).

A student taking any courses for graduate credit must maintain a cumulative quality-point index in these courses of 3.00 or the equivalent. If in 12 hours or more of graduate credit the cumulative (graduate) index falls below 3.00, the student will be placed on probation. If in 12 hours or more of graduate credit, the cumulative (graduate) index falls to 2.25 or below, the student will be suspended.

A student taking (or having taken) some courses for undergraduate credit and taking (or having taken) some courses for graduate credit will be considered on probation if the standards stated above are not maintained in either undergraduate or graduate work. Similarly a student suspended from undergraduate or graduate work is suspended from all work in the Division.

A suspended student will not be permitted to audit a course in the Division during the period of suspension.

CHANGES IN PROGRAM OF STUDIES

Changes within the Division of University Students.—A student may not change or drop courses (see "Withdrawal," page 46) or change his status to that of auditor except with the approval of the Dean.

Change from one section to another of the same course may be made with the approval of the Dean and the department concerned.

Transfer within the University.—Transfer to or from the Division of University Students may be made only with the approval of the deans concerned.

Application for transfer to degree candidacy will be considered only after the completion of at least one semester in the Division of University Students or upon request from the college or school to which the student is seeking admission.

The student wishing to transfer to degree candidacy must meet the conditions of the college or school to which he is applying. It is the responsibility of the student to consult the relevant degree-granting college or school concerning all conditions to be met and the amount of work transferrable.

SECONDARY SCHOOL HONORS PROGRAM

The outstanding secondary school student in the Washington metropolitan area who wishes to enrich his academic background and participate in stimulating college work is encouraged to seek admission to the George Washington University's Secondary School Honors Program. The Honors Student is enrolled in regular college courses of his own choosing appropriate to his level of study.

his background, and his aptitude as determined through consultation with his high school counselors and advisers at the University.

Credit earned in the Program is applicable toward a degree at George Washington University should the student later matriculate here. The transfer of credit elsewhere depends upon the policies of the individual schools to which the student might later apply.

Admission to the Honors Program is highly competitive. Normally, only 15 students a semester will be admitted to this Program, but each student will receive a scholarship totaling 50 per cent of his tuition (excluding laboratory fees). Admission is for one semester only, but students doing well will be given preference for continuation and may be readmitted for a second semester. Criteria for admission are based on a transcript of the student's grades to date, available test scores, evidence of emotional and intellectual maturity, and the results of the interview with the Director.

Application forms and further information may be obtained from Miss Jean M. Gladding, Director of the Secondary School Honors Program, Division of University Students, George Washington University, Washington, D.C. 20006. No applications will be considered after September 1 for the fall semester or January 1 for the spring semester. For application for the summer session see the *Summer Sessions Catalogue*.



THE SUMMER SESSIONS

Dean C.W. Cole
Assistant Dean Lawrence Winkler

DURING THE SUMMER OF 1971, Columbian College of Arts and Sciences, the Graduate School of Arts and Sciences, the School of Government and Business Administration, the School of Public and International Affairs, and the Division of University Students offer courses in two 5-week sessions. The School of Engineering and Applied Science offers courses in an 8-week period. The National Law Center offers courses in two 6-week sessions and one 13-week session; the School of Education offers courses in a 6-week session and three 3-week workshop sessions. In addition, a carefully planned group of special programs will be offered to serve a variety of student needs.

For a complete statement concerning summer-term work, see the *Summer Sessions Catalogue*.



PROGRAM OF POLICY STUDIES IN SCIENCE AND TECHNOLOGY

Director L.H. Mayo

THE PRIMARY OBJECTIVE of the Program of Policy Studies in Science and Technology is to encourage the continuing development of a University policy research capability directed toward the complex issues confronting society. As an integral part of the University, the Program undertakes to serve as an organizing element and to provide a neutral forum for the discussion of policy issues—current and prospective—by representative community groups, and as an advisory and research resource for policy makers in both public and private sectors.

Activities of the Program reflect a number of ways in which a wide range of interdisciplinary talents can be brought to bear upon the analysis of policy problems, particularly those involving the impact of advancing technology on the processes, values, and institutions of society.

By means of the Program of Policy Studies in Science and Technology, George Washington University is moving toward an institutional approach to the policy analysis function as contrasted with the highly fragmented and largely uncoordinated pattern of "institutes," "centers," and "study groups" which exists at most universities. The Program of Policy Studies concept is novel in its attempt to provide an organization that strengthens the University's ability to address itself to broad issues of public policy. This approach envisages a continuing interaction among the professional staffs of the Program of Policy Studies in Science and Technology, other policy research groups, and other faculty members of the schools and departments of the University.

The following are the primary study areas of the Program:

1. The structure and functions of institutions designed to stimulate, utilize, regulate, and appraise the application of science and technology to the achievement of basic community goals, and to society's needs, national and international.

2. The application of modern research and development management concepts and skills to the planning, programming, and managing of governmental programs and urban social problem areas.

The Program has also undertaken to bring into focus the courses and seminars offered by the University which are directly related to the interface area of science, society, and public policy. An announcement is published every Fall.

The Program supports or conducts a number of activities, including studies, monographs, special reports, and professional seminars with government, in-

dustry, policy research, and university representatives. An Annual Report of current activities is published in the Fall.

Funding sources for the Program of Policy Studies in Science and Technology include the University; a basic institutional grant from NASA; and grants and contracts from other agencies such as the Department of Health, Education, and Welfare (Office of Education); the Department of Commerce (National Bureau of Standards); the Department of State (Arms Control and Disarmament Agency); the Department of Justice (National Institute of Law Enforcement and Criminal Justice); the National Endowment for the Humanities; the National Science Foundation; the Department of Housing and Urban Development; the Department of Transportation; as well as the Battelle Memorial Institute and the Ford Foundation.

PROFESSIONAL STAFF*

Director of the Program: Louis H. Mayo, *Vice President for Policy Studies and Special Projects; Professor of Law*

Guy Black, *Senior Staff Scientist; Associate Professor of Business Economics*

James M. Brown, *Coordinator, Urban Problems Seminar Series; Director, Land Use Project; Professor of Law*

Robert L. Chartrand, *Program Associate; Information Sciences Specialist; Library of Congress*

Vary T. Coates, *Research Scientist (Political Science)*

Clarence H. Danhof, *Senior Staff Consultant (Economics)*

Richard F. Ericson, *Senior Staff Scientist; Director, Interdisciplinary Systems and Cybernetics Project; Professor of Management*

William A. Fischer, *Research Associate (Industrial Management), Civil Aviation Study*

Joseph Foa, *Professor of Engineering and Applied Science*

Phillip A. Graham, *Research Associate (Aeronautical Engineering), Civil Aviation Study*

Harold P. Green, *Professor of Law; Director, Law, Science, and Technology Program*

John Hanessian, Jr., *Senior Staff Scientist, Director, International Studies Group; Associate Professor of International Affairs*

Kathryn L. Hensley, *Research Associate, Educational Policy Group*

Guenther Hintze, *Research Professor of Electrical Engineering*

Raphael G. Kasper, *Research Scientist (Nuclear Engineering)*

John M. Logsdon, *Research Scientist; Assistant Professor of Public Affairs and Political Science*

Joseph B. Margolin, *Senior Staff Scientist; Director, Educational Policy Group; Associate Professorial Lecturer in Psychology*

William H. Marlow, *Director, Institute for Management Science and Engineering; Professor of Applied Science*

Marion R. Misch, *Research Scientist, Educational Policy Group*

Ellis R. Mottur, *Senior Staff Scientist; Director, Technology Assessment Implementation Project*

* Staff listing consists of members who allocate all or a substantial portion of their effort to Program activities. Directors and members of the staffs of other policy study groups in the University also participate in the various seminar series, conferences, and other activities of the Program.

Bernard A. Schriever, *Senior Staff Scientist; Vice Chairman of the Advisory Committee*
Nozer D. Singpurwalla, *Associate Professor of Applied Science*
Theodore Suranyi-Unger, *Senior Staff Consultant (Economics); Professorial Lecturer in Economics*

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Joseph L. Fisher, *President, Resources for the Future, Inc., Washington, D.C.*
Lawrence Levy, *President, Allied Research Associates, Concord, Mass.*
Dwight Waldo, *Albert Schweitzer Professor in the Humanities, Syracuse University*
Reuben E. Wood, *Professor of Chemistry, George Washington University*



SPONSORED RESEARCH

Assistant Vice President for Research C.J. Lange

THE RESEARCH PROGRAMS listed in this section are special programs which are established for the specific purpose of attacking in an academic atmosphere problems proposed by the individual projects or submitted by the sponsoring agency. Cooperation between these programs and the various departments of instruction is as close as the nature and needs of the programs and departments will permit.

BIOMETRIC LABORATORY

Director R.R. Bonato
Assistant Director J.J. McKeon

The Biometric Laboratory applies statistical techniques to pharmacological problems related to mental health. It was established under a contract with the National Institutes of Health. The laboratory assists investigators throughout the United States in planning research and in analyzing data. The majority of these research projects concern the effects of drugs on behavior.

CENTER FOR MANPOWER POLICY STUDIES

Director Sar Levitan

The Center for Manpower Policy Studies is devoted to the evaluation of federally-supported manpower, antipoverty, and related programs. The Center is financed by a grant from the Ford Foundation and offers in conjunction with the Department of Economics graduate courses in labor economics and manpower policy.

EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) CLEARINGHOUSE ON HIGHER EDUCATION

Director C.J. Lange
Associate Director Nancy Lewinsohn

The Educational Resources Information Center (ERIC) Clearinghouse on Higher Education was established in the Fall of 1968 with the support of the U.S. Office of Education; it is the nineteenth in a national network of education information centers. The Clearinghouse is responsible for the acquisition,

evaluation, abstracting, indexing, and dissemination of research reports and other documents dealing with problems and issues in the field of higher education. It also prepares state-of-the-art and review papers related to higher education.

INSTITUTE FOR MANAGEMENT SCIENCE AND ENGINEERING

Director W.H. Marlow

The Institute for Management Science and Engineering provides a multidisciplinary environment for innovative graduate teaching and substantial opportunities for research activities and public service under diversified sources of external support.

The Institute works closely with the University's Program of Policy Studies in Science and Technology in the application of developing technologies to contemporary problem areas. Through its Program in Logistics, the Institute performs research leading to the development of a science in logistics featuring principles and methodology for resource allocation problems in civil affairs and national defense efforts.

MID-ATLANTIC REGION SPECIAL EDUCATION INSTRUCTIONAL MATERIALS CENTER

Director R.S. Cottrell, Jr.
Assistant Director Carol J. Gross

The Mid-Atlantic Region Special Education Instructional Materials Center (MAR-SEIMC) was established in March, 1967, by the Bureau for Education of the Handicapped, U.S. Office of Education, and George Washington University to collect, organize, and disseminate information and materials about and for the instruction of handicapped children and youth. Providing assistance in the development of similar centers throughout the Mid-Atlantic Region (Delaware, the District of Columbia, Maryland, New Jersey, Pennsylvania, and Virginia) is a major activity. Workshops are conducted both in the Center and in the field. MAR-SEIMC is part of a national network of similar centers.

NATURAL RESOURCES POLICY CENTER

Acting Director Mary Holman

The Natural Resources Policy Center was established in September, 1965, to sponsor faculty and student research in the area of natural resources and environmental quality; to develop and undertake activities that promote undergraduate and graduate education; and to train employees of public resource agencies. The program of the Center focuses particularly on increasing the contribution of the social sciences – economics, planning, and the political institutions of natural resources agencies– so that these disciplines and related fields of knowledge may be brought to bear more fruitfully on contemporary problems relating to the management and development of natural resources. The Natural Resources Policy Center, which provides a focus on natural resource and environmental quality problems and issues, is an integral part of the Department of Economics in both the design of its research program and its courses.

OPERATIONAL AND DEMOGRAPHIC ANALYSIS FOR MATERNAL AND CHILD HEALTH CARE PROJECT

Director R.R. Bonato
Co-director and Principal Investigator Margaret Pratt

This project is concerned with computer-supported research into the maternal and child mortality and prematurity levels of the United States and the socio-economic and health-facilities factors which affect these levels. In addition to this research, the project designs and implements informational and evaluative studies of interest to the sponsoring agency. A major activity has been the development and field testing of the government's Provisional Reporting System on Family Planning Services, which has now been turned over to the United States government for operation. The project is now concerned with an investigation of the basic structure and standards essential to Health Programs Management Information Systems. The project also is engaged in studies of projects providing comprehensive services to pregnant teenage girls. This project is operated under a grant from the Maternal and Child Health Service, HSMHA, Department of Health, Education, and Welfare.

SOCIAL RESEARCH GROUP

Director I.H. Cisin
Associate Director H.J. Parry

The Social Research Group conducts surveys and experiments with concentration on basic research underlying an approach to the solution of social problems.



COURSES OF INSTRUCTION

ON THE FOLLOWING PAGES OF THIS CATALOGUE, under the alphabetically arranged names of the departments of instruction and special interdepartmental programs, are listed the courses of instruction offered by the University in the academic year 1971–72. The courses as here listed are subject to change. The University reserves the right to withdraw any course announced.

HOURS OF INSTRUCTION

Classes are scheduled in the morning, afternoon, and evening. Evening and daytime sections of the same course are identical, are taught by the same staff of instructors, and carry the same amount of credit. By taking the evening and summer classes and extending the time of study beyond the usual four years, a part-time student may complete the requirements and obtain a degree.

EXPLANATION OF COURSE NUMBERS

First-group courses.—Courses numbered from 1 to 100 are planned for students in the freshman and sophomore years. With the approval of the adviser and the Dean, they may also be taken by juniors and seniors. In certain instances, they may be taken by graduate students to make up undergraduate deficiencies or as prerequisites to advanced courses, but they may not be taken for graduate credit.

Second-group courses.—Courses numbered from 101 to 200 are planned for students in the junior and senior years. They may be taken for graduate credit only upon the approval of the dean and the instructor at the time of registration. Such approval is granted only with the provision that students must complete additional work in order to receive graduate credit.

Third-group courses.—Courses numbered from 201 to 300 (in the Graduate School of Arts and Sciences, the School of Government and Business Administration, and the School of Public and International Affairs); courses numbered 301 to 400 (in the School of Education) are planned primarily for graduate students. They are open, with the approval of the instructor, to qualified seniors; they are not open to other undergraduates. Qualified seniors in the School of Government and Business Administration registering for these courses must have a 3.00 average, the prior approval of the department chairman who is responsible for the graduate course, and the prior approval of the Dean.

Fourth-group courses.—Courses numbered 301 to 400 in the Graduate School of Arts and Sciences are limited to graduate students; but they are pri-

marily for doctoral candidates. Courses numbered 301 to 400 in the School of Government and Business Administration are limited to doctoral students. In the School of Education fourth-group courses, numbered 401 to 500, are limited to graduate students with Master's degrees from accredited institutions.

KEY TO ABBREVIATIONS

The following abbreviations are used in this catalogue for course designations and by students in registering for courses.

Acct	Accounting
AmCv	American Civilization
Anat	Anatomy
Anth	Anthropology
Bioc	Biochemistry
B Sc	Biological Sciences
B Ad	Business Administration
Chem	Chemistry
CE	Civil Engineering
Clas	Classics
Asia	East Asian Languages and Literatures
Econ	Economics
Educ	Education
EE	Electrical Engineering
Engl	English
E Ad	Engineering Administration
Epid	Epidemiology and Environmental Health
Hum	Experimental Humanities
ForS	Forensic Science
Fren	French
Gnet	Genetics
Geog	Geography and Regional Science
Geol	Geology
Germ	Germanic Languages and Literatures
HCA	Health Care Administration
Hist	History
HonP	Honors Program—Columbian College Lower Division
Ital	Italian
Jour	Journalism
Mgt	Management Science
Math	Mathematics
Micr	Microbiology
Mus	Music
Path	Pathology
Phar	Pharmacology
Phil	Philosophy
PE	Physical Education
Phys	Physics
Phyl	Physiology
P Sc	Political Science
Psyc	Psychology
P Ad	Public Administration
Rel	Religion
Slav	Slavic Languages and Literatures
Soc	Sociology
Span	Spanish
S Ed	Special Education
Sp&D	Speech and Drama
Stat	Statistics
U&RP	Urban and Regional Planning

SEMESTER HOURS OF CREDIT

The number of semester hours of credit given for the satisfactory completion of a course is, in most cases, indicated in parentheses after the name of the course. Thus, a year course giving 3 hours of credit each semester is marked (3–3), and a semester course giving 3 hours of credit is marked (3). A semester hour usually consists of the completion of one fifty-minute period of class work or of one laboratory period a week for one semester.

TIME OF COURSE OFFERINGS

Following most course descriptions is a parenthetical statement listing the time (day or evening) and the semester (fall or spring) for which the course is scheduled for 1971–72. The term "academic year" is used only with two-semester courses, and indicates that the first half of the course is to be offered in the fall semester and the second half in the spring semester. If no parenthetical statement appears, the course is not scheduled to be offered during the

fall or spring semesters of 1971–72. Offerings for the summer sessions are not designated in this catalogue. Students should consult the *Summer Sessions Catalogue* or *Schedule of Classes* for summer offerings. A *Schedule of Classes* is also published for each fall and spring semester which provides more exact and up-to-date information concerning the time of course offerings.

Accounting

Professor E.J.B. Lewis
Professorial Lecturers M.P. Pujol, A.L. Litke, Daniel Borth
Associate Professors F.C. Kurtz, Chei-Min Paik, A.J. Mastro *(Chairman)*, C.D. Hughes, M.G. Gallagher
Associate Professorial Lecturer Raymond Einhorn
Assistant Professorial Lecturers R.W. Perkins, E.M. Wysong, Jr., E.J. Shuchart

Programs of study in Accounting leading to the degrees of *Bachelor of Business Administration*, *Master of Business Administration*, *Doctor of Business Administration*, and *Doctor of Public Administration* are offered by the School of Government and Business Administration (see pages 127–54).

1–2 Introductory Accounting (3–3) Gallagher and Staff

Basic understanding of accounting information: accounting concepts, procedures, analyses, and reports as an integral part of a broad management information system; the accounting measurement and communication of significant economic and financial data. Prerequisite to Acct 2: Acct 1. Students who have received credit for Acct 115 cannot receive credit for Acct 1–2. (Acct 1 and 2: fall and spring—day and evening)

101 Cost and Budgetary Control (3) Hughes
(Formerly Cost Accounting)

Topics of prime managerial concern: cost behavior and volume-profit relationships, responsibility accounting, standard costs, flexible budgets, cost structures for control and motivation, relevant costs for nonroutine decisions; cost concepts. Prerequisite: Acct 1–2. Students who have received credit for Acct 193 or 215 cannot receive credit for Acct 101. (Fall—day; spring—evening)

111 Financial Statement Analysis (3) Hughes, Litke

The analysis and interpretation of financial statements for the guidance of management, directors, stockholders, and creditors. Prerequisite: Acct 1–2. (Spring—evening)

115 Survey of Financial Accounting (3) Hughes
(Formerly Survey of Accounting)

Development, presentation, and interpretation of financial accounting data necessary to the management process. Students who have received credit for Acct 1–2 cannot receive credit for Acct 115. (Fall—day and evening; spring—evening)

121 Intermediate Accounting (3) Kurtz

In-depth study of accounting functions and basic theory: acquisition of assets and services, income and equity accounting, preparation and analy-

sis of financial statements. Prerequisite: Acct 1–2. (Fall—day; spring—evening)

Kurtz

122 **Intermediate Accounting** (3)

An in-depth study of special topics: partnership, consignment, installment, liquidation, retail, estate, and trust accounting. Prerequisite: Acct 121.

Mastro

132 **Accounting Theory** (3)

Current thought as reflected in the pronouncements of leading professional and accounting research associations, major contributions to accounting literature. Prerequisite: Acct 121. (Spring—evening)

Lewis, Pujol

141 **Governmental Accounting** (3)

Appropriation, encumbrance, and fund accounting for governmental and institutional entities. Prerequisite: Acct 1–2. (Fall—evening)

Lewis

144 **Federal Accounting** (3)

Accounting procedures in the federal government, with emphasis on agency-level accounts and accounting support for cost-based budgets. Prerequisite: Acct 141.

Gallagher

161 **Federal Income Taxation** (3)

Federal income tax concepts applicable to individuals and corporations, differences between tax accounting and financial accounting. (Fall—day; spring—evening)

Gallagher

162 **Tax Research and Planning** (3)

Substantive federal tax provisions relating to corporations, partnerships, security transactions, estates, gifts, and pension and profit-sharing plans; emphasis on tax research and tax-planning objectives.

Kurtz

171 **Auditing** (3)

Principles and procedures of auditing: generally accepted auditing standards, internal control, audit objectives and reports, form-preparation-use of audit work papers, audit evidence. Prerequisite: Acct 121. (Fall—evening)

Kurtz

172 **Audit Planning and Control** (3)

Standards of audit reporting and other current auditing topics, including application of statistical sampling techniques to auditing, auditing electronic systems, and management advisory services. Prerequisite: Acct 171.

Hughes

181 **Accounting Systems** (3)

Organization and use of accounting information: fundamentals of accounting data origination, classification, control, and reporting; nature of systems design; problems encountered in the development, design, and installation of accounting systems; accounting communication patterns. Prerequisite: Acct 101, 171. (Spring—evening)

Kurtz

191 **Advanced Accounting** (3)

Application of accounting theory to special areas: consolidated statements, business combinations, earnings per share, foreign exchange, price-level adjusted statements, source and application of funds. Prerequisite: Acct 121. (Spring—evening)

193 **Business Budgeting** (3) **Lewis, Paik**

Principles, techniques, and procedures involved in the development, installation, and operation of a system of budgetary control to aid management. Prerequisite: Acct 1–2. Students who have received credit for Acct 101 cannot receive credit for Acct 193. (Fall—day; spring—evening)

196 **Management Decisions and Accounting** (3) **Hughes**

Analysis of data required in capital budgeting, inventory management, and other decisions, cash-flow and probability data; advanced cost accounting systems. Prerequisite: Acct 101.

THIRD GROUP

215 **Survey of Managerial Accounting** (3) **Paik**

Study of the nature, preparation, analysis, and interpretation of accounting reports primarily from the management point of view. Prerequisite: Acct 1–2 or 115. Students who have received credit for Acct 101 cannot receive credit for Acct 215. (Fall and spring—evening)

231 **Contemporary Accounting Theory** (3) **Mastro**

Accounting principles and concepts and recent theories concerned with the valuation and amortization of assets and determination of income. Prerequisite: 6 semester hours of accounting.

241 **Accounting and Related Disciplines** (3) **Paik**

Interrelationships of accounting and behavioral sciences, economics, mathematical methods, operations research. Prerequisite: 6 semester hours of accounting.

245 **Decision Systems and Accounting** (3) **Paik**

Limited to students in the Navy Graduate Financial Management Program. Problems encountered in managing financial and related information systems in complex organizations, the relationships between accounting in its broadest sense and management control and decision systems. (Fall)

246 **Governmental Accounting and Budgeting Problems** (3) **Lewis, Borth**

Current problems in federal financial planning, programming, budgeting, accounting, and auditing. Prerequisite: Acct 144.

262 **Business Income Taxation** (3) **Gallagher**

Federal income tax concepts applicable to corporations, partnerships, and their owners; emphasis on tax planning factors in business decisions and tax research. (Fall—evening)

275 **Contemporary Auditing Theory and Procedures** (3) **Kurtz**
(Formerly Internal Control and Auditing)

Study of generally accepted auditing standards; internal control and internal auditing, application of statistical sampling to auditing, audit of electronic data processing systems. Prerequisite: Acct 1–2 or 115. (Spring—evening)

276 **Management Planning and Control** (3) **Paik**

An integrative case study approach to formal management systems for planning, control, and decisions; grouping of activities, value indices for

organizational sub-units, transfer pricing, contemporary control systems, accounting framework and cycle, systems for project management. Prerequisite: Acct 1–2 or 115. (Spring—evening)

282 **Accounting Information Systems** (3) Hughes

Development and application of accounting system theory, including analysis, design, and implementation. Integration of automatic data processing, accounting systems, and management information systems. Prerequisite: Acct 1–2 or 115. (Spring—evening)

292 **Professional Accounting Review** (3) Lewis

Review and coordination of principles and techniques developed in the accounting curriculum, in preparation for general practice in the field of accountancy and for professional accounting examinations. Prerequisite: Acct 101, 141, 161, 171, and 191.

295 **Seminar in Accounting** (3) Mastro

Selected accounting studies: critical analysis and evaluation developed in seminar discussions and papers. Prerequisite: Acct 1–2 or 115. (Fall and spring—evening)

297 **Accounting Reading and Research** (3) Mastro

299 **Thesis Seminar** (3) Mastro and Staff

(Fall and spring)

300 **Thesis Research** (3) Mastro and Staff

(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Business Administration or Doctor of Public Administration general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Business Administration or Doctor of Public Administration candidates. May be repeated for credit. (Fall and spring)

American Studies Program

Professors R.H. Walker, Jr., C.C. Mondale
Associate Professor Letitia Brown
Assistant Professors H.F. Gillette, Jr., B.M. Mergen *(Director)*
Special Lecturer R.S. French

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The Council serves the American Studies Program in an advisory capacity from several points of view, as follows:

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From the Alumni

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Wilcomb E. Washburn (Smithsonian Institution)

From the Faculty

The American Studies staff of instruction and the Faculty Advisory Committee, ex officio

Bachelor of Arts with a major in American Civilization (Field-of-Study).—Prerequisite: the Arts and Letters curriculum, page 76. AmCv 71–72 *Introduction to American Civilization* is recommended.

Required: the general requirements, pages 81–85, and the satisfactory completion of the American Civilization Major Examination and/or Essay during the senior year. The program is based on the development of a coordinated understanding of American civilization, past and present, acquired through the offerings of traditional departments and special courses within the program. Majors will be expected to develop a concentration of at least 18 semester hours in humanistic subjects, focusing on the United States but including relevant foreign background. A secondary emphasis of at least 12 semester hours will be expected in social science. Art, literature, philosophy, or religion may be chosen as a humanistic concentration; anthropology, economics, geography, political science, or sociology may be chosen as a social science; history may be chosen as either the humanistic concentration or the social science emphasis. As seniors, in AmCv 179–80, majors will be given an opportunity to coordinate and unify their varied curricular experiences.

Master of Arts in the field of American Civilization.—Prerequisite: the degree of Bachelor of Arts with an undergraduate major in American Civilization or in the subject in which concentration is contemplated.

Required: the general requirements, pages 90–96, including (1) AmCv 271–72 (6 semester hours), a seminar in the methods and materials for teaching and research in American Civilization; (2) 18 additional semester hours in a carefully related pattern, focusing on a concentrated approach to the study of American Civilization; (3) a Master's thesis (6 semester hours) written on an approved topic under the

direction of the instructor in whose field the major emphasis falls; (4) a Master's Comprehensive Examination reflecting the candidate's area of concentration.

Doctor of Philosophy in the field of American Civilization.—This program combines work in the humanities and or social sciences as preparation for research and teaching, with the option of stressing preparation for museum and library careers. Applicants are required to have an adequate background in the humanities and/or social sciences as they apply to the understanding of American civilization.

Required: the general requirements, pages 90–94, 96–98. Candidates must pass a General Examination in four areas. An area in American Cultural History and an area in the culture of some area outside the United States (i.e., English Literature, European History) are required. The other two areas may be chosen from the following groups: (1) American Diplomatic, Economic, Political, or Social History; American Literature, Art, Philosophy or Religion; Afro-American History; or some areas of the social and behavioral sciences; (2) in affiliation with the Library of Congress—supervised historical study in bibliographic resources including American History and Politics, Cartography, Cross-cultural Studies, Government Documents, Graphic Arts and Music, Motion Pictures and Recorded Sound, Printing and Bookmaking; (3) in affiliation with the Smithsonian Institution—supervised studies including Aspects of Cultural and Political History, Fine Arts and Folk Arts, History of American Arts and Manufacturers, History of Exploration, History of Science and Technology, Maritime History, Military History, Naval History. Additional areas of study may be arranged within the University and in both the Library of Congress and Smithsonian cooperative programs. Special announcements concerning these programs are issued periodically and are available in the Office of the Director of the American Studies Program.

Research fields for the dissertation may be chosen from any of the above except those dealing with the culture of an area outside the United States.

AMERICAN CIVILIZATION

FIRST GROUP

71–72 **Introduction to American Civilization** (3–3) Mergen, Brown

Themes and issues in American civilization since Colonial times, with emphasis on their contemporary importance. Recommended for sophomores who plan to major in American Civilization. (Academic year—day and evening)

SECOND GROUP

Staff

101 **American Civilization** (3) Sten

161–62 **Studies in American Literature** (3–3)

Same as Engl 161–62. Major factors in the national cultural tradition as shown by outstanding writers. Prerequisite: Engl 51–52 or 71–72. (Academic year—day and evening)

179–80 **Proseminar in American Civilization** (3–3) Gillette, Walker, Mergen

Coordinating course for seniors majoring in American Civilization. (Academic year—day)

*192 **The American Cinema** (3) Claeyssens and Staff

History and criticism of American films. At least one film will be shown each week, on which there will be readings, discussions, and lectures. The

* Joint offering of the American Studies Program and the Department of Speech and Drama. Students may register under either designation.

course will enable the student to develop an ability to see and evaluate cinema techniques, to express the evaluation clearly in writing, and to understand the role of films in the context of American culture.

THIRD GROUP

271–72 **Seminar: Research and Teaching in American Civilization** (3–3) Gillette

Consideration of American studies as an area for research and teaching; introduction to bibliography. Required of candidates for the degree of Master of Arts in the field of American Civilization. (Academic year—day)

*273–74 **Research Seminar: Materials in American Negro Culture** (3–3) Brown

Prerequisite: Hist 173–74 or equivalent. (1971–72 and alternate years: academic year—evening)

281 **Seminar: Early American Literature** (3) McCandlish

Same as Engl 281. (Fall—day)

289–90 **Seminar: Topics in American Civilization** (3–3) Mondale

Research problems selected by the instructor. Preparation in American Cultural History or other area appropriate to the topic of the seminar. (Academic year—day)

295 **Independent Studies** (arr.) Staff

Limited to Master's candidates. Permission of instructor, in writing, required. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

FOURTH GROUP

*373–74 **Readings on the Negro in American Culture** (3–3) Brown

For students preparing for the Doctor of Philosophy general examination in the field of the Negro in American Culture. (1972–73 and alternate years)

379–80 **Readings in American Cultural History** (3–3) Mergen, Walker

For students preparing for the Doctor of Philosophy general examination in the field of American Civilization. (Academic year—day)

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

*Joint offering of the Department of History and the American Studies Program. Students may register under either designation.

COURSES OFFERED IN AFFILIATION WITH THE LIBRARY OF CONGRESS

The Graduate School of Arts and Sciences is affiliated with the Library of Congress in a program leading to the degree of Doctor of Philosophy. The following courses are offered at the Library of Congress by members of its staff:

THIRD GROUP

255–56 **Research Orientation Seminar: Americana in the Library of Congress** (3–3)

Examination of the collections of the Library of Congress with the aim of increasing understanding of American culture and awareness of library-oriented research problems and possibilities. For students in the affiliated doctoral program, this course may lead directly to a field in "Research Materials for the Study of American Life: Their Content, Collection, Arrangement, and Use." (Academic year—day)

FOURTH GROUP

355–56 **Seminar: Advanced Library Research** (3–3)

Introduction to practical problems of research in librarianship and control of collections. Supervised study in selected subject fields; emphasis on collections in the Library of Congress and concentrated work in a special collection. Prerequisite: AmCv 255–56. (Academic year)

389 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy general examination in fields offered in affiliation with the Library of Congress. May be repeated for credit. (Fall and spring)

390 **Dissertation Research** (arr.)

For Doctor of Philosophy candidates preparing dissertations based upon or significantly related to collections of the Library of Congress. Supervised by specialists at the Library. Prerequisite: AmCv 355–56. (Fall and spring)

COURSES OFFERED IN AFFILIATION WITH THE SMITHSONIAN INSTITUTION

The Graduate School of Arts and Sciences is affiliated with the Smithsonian Institution's Program for Graduate Students in the History of American Civilization. The following courses are offered at the Museum of History and Technology, by members of its staff:

THIRD GROUP

250 **Orientation Course: Material Aspects of American Civilization** (3)

Familiarization with the historical collections of the Smithsonian Institution and introduction to opportunities for research and publication based on historical objects. Required of all students in the Master's and doctoral programs affiliated with the Smithsonian Institution. (Fall—day)

OURTH GROUP

351–52 **Research in Selected Aspects of American Civilization** (3–3)

Supervised study and/or field work in selected subject areas related to the activities of the Smithsonian Institution. Prerequisite: AmCv 250. (Academic year—day)

394 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy general examination in fields offered in affiliation with the Smithsonian Institution. May be repeated for credit. (Fall and spring)

395 **Dissertation Research** (arr.)

For Doctor of Philosophy candidates preparing dissertations significantly related to the material aspects of American civilization. Students work under curatorial supervision at the Smithsonian Institution. Prerequisite: AmCv 351–52. May be repeated for credit. (Fall and spring)

Anatomy

Professors I.R. Telford *(Chairman)*, Paul Calabrisi, C.M. Goss *(Visiting—Medical History)*, F.D. Allan, T.N. Johnson
Professorial Lecturers J.L. Angel, T.S. Reese
Associate Professor J.B. Christensen
Associate Clinical Professor R.N. Brown
Associate Professorial Lecturers J.A. Di Paolo, L.E. Church, Joan Blanchette-Mackie
Assistant Professors E.N. Albert, Marilyn Koering

Master of Science in the field of Anatomy.—Prerequisite: a Bachelor's degree with a major in a biological science or Chemistry from this University, or an equivalent degree. The undergraduate program must have included the following courses, or equivalent: B Sc 11–12; Chem 11–12, 51–52, 53–54; Phys 1, 2. Bioc 221–22 is recommended as an elective.

Required: the general requirements, pages 90–96, including Anat 202, 203, 204, 205, 221–22, 295, 299–300, and graduate courses in Biochemistry, Physiology, or related fields selected with the approval of the Department. It is not always possible to arrange courses and research so that the student can be assured of completing all the required work in one academic year.

Doctor of Philosophy in the field of Anatomy.—Required: the general requirements, pages 90–94, 96–98. Candidates must fulfill the tool requirement by passing a reading knowledge examination in French and German or by passing the examination in one of these languages and satisfactorily completing the tool requirment in Biostatistics. The General Examination must cover at least four fields, two of which must be in anatomical disciplines.

Research fields: Cell Ultrastructure, Embryology, Gross Anatomy, Histology, Human Genetics, Neuroanatomy, and Physical Anthropology.

202 **Gross Anatomy** (6) **Calabrisi and Staff**

Regional dissections of adult cadaver supplemented with lectures and X-rays. Laboratory fee, $30. (Fall—day)

203 **Human Embryology** (1) **Allan**

Origin and development of human body; emphasis on value of embryology in interpreting anatomical anomalies. (Fall—day)

204 **Neuroanatomy** (2) Johnson and Staff

Gross and microscopic anatomy of central nervous system and special senses. Laboratory fee, $13. (Fall—day)

205 **Microscopic Anatomy** (3) Telford and Staff

Microscopic structure of cells, tissues, and organs of the human body. Laboratory fee, $13. (Fall—day)

221–22 **Seminar** (1–1) Johnson and Staff

Research reports and discussions of special topics by staff and graduate students. (Academic year—day)

249 **Introduction to Anatomical Research** (1) Telford and Staff

Major research techniques as applied to biological materials in the various anatomical disciplines. (Fall—day)

252 **Physical Anthropology** (1) Angel

Variations in man and factors affecting him, human evolution and racial differences, anatomy and culture of ancient man. (Spring—day)

254 **Fetal Anatomy** (2) Allan

Dissection of early and late human fetus. Comparison of fetal and adult structures. 20 students. Laboratory fee, $10. (Spring—day)

256 **Human Genetics** (1) C.B. Jacobson

General principles of genetics, new cytogenetics technics, aneuploidy in man and its significance, biochemical aspects of heredity, genetic counseling. (Spring—day)

258 **Cytology** (3) Albert and Staff

Detailed study of morphology and function of the cell and its organelles. Basic cytological techniques emphasized. Laboratory fee, $20. (Spring—day)

260 **Electron Microscopy in Cellular Biology—Lecture** (1) Blanchette-Mackie

Anat 260 may be taken without 261. (Spring—day)

261 **Electron Microscopy in Cellular Biology—Laboratory** (2) Blanchette-Mackie

Prerequisite or concurrent registration: Anat 260. 12 students. Laboratory fee, $15. (Spring)

262 **Gross Anatomy of Upper and Lower Extremities** (2) Calabrisi

Detailed dissection, supplemented by X-ray anatomy: discussions, assigned reading. 24 students. Laboratory fee, $10. (Spring—day)

264 **Gross Anatomy of Head and Neck** (2) Christensen

Detailed dissection, supplemented by X-ray anatomy: discussions, assigned reading. 24 students. Laboratory fee, $10. (Spring—day)

266 **Gross Anatomy of Thorax and Abdomen** (2) Christensen

Detailed dissection, supplemented by X-ray anatomy: discussions, assigned reading. 24 students. Laboratory fee, $10. (Spring—day)

268 **Gross Anatomy of Pelvis, Perineum, and Lower Extremity** (2) — Calabrisi

Detailed dissection, supplemented by X-ray anatomy; discussions, assigned reading. 24 students. Laboratory fee, $10. (Spring—day)

270 **Dissection of the Human Brain** (1) — Johnson

Dissection of major pathways and nuclei of the brain with consideration of ventricular system; conferences and assigned reading. 20 students. Laboratory fee, $10. (Spring—day)

272 **Autonomic Nervous System** (1) — Allan

Development, microscopic and gross anatomy, function of central and peripheral components of autonomic nervous system. (Spring—day)

274 **Tissues of the Body** (1) — Telford

Basic concepts in anatomy, with emphasis on primary tissues of the body —their histogenesis, growth, functions, regenerative capacities, aging, death. (Spring—day)

276 **Advanced Studies in Anatomy** (1) — Telford and Staff

Lectures and conferences on selected anatomical subspecialities—endocrinology, teratology, growth, etc. May be repeated for credit. (Spring —day)

278 **History of Anatomy and Surgery** (1) — Goss

Lectures and discussions related particularly to the lives and times of outstanding contributors to the advancement of the science of anatomy and surgery. (Spring—day)

295 **Research** (arr.) — Staff

Content differs each time course is offered; may be repeated for credit. Fee to be arranged. (Fall and spring)

299–300 **Thesis Research** (3–3) — Staff

(Fall and spring)

398 **Advanced Reading and Research** (arr.) — Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) — Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Anthropology

Professorial Lecturers J.L. Angel, Ruth McKay
Associate Professors R.K. Lewis *(Chairman)*, R.L. Humphrey, Jr.
Assistant Professors Ruth Krulfeld, V.K. Golla, Suzanne Simons, Leslie Ann Brownrigg

Bachelor of Arts with a major in Anthropology (Departmental).—Prerequisite: the Arts and Letters curriculum, page 76, including Anth 1–2.

Required: in addition to the general requirements stated on pages 81–85, 24 semester hours in Anthropology, which must include 192 and second-group Anthropology courses in each of the following categories: Aspects of Culture (courses numbered in the 150's), Linguistics (courses numbered in the 160's), Ethnology (courses numbered in the 170's), and Physical Anthropology and Archeology (courses numbered in the 180's). Students in the senior year are encouraged to elect courses from the following: B Sc 108; Engl 115; Geog 145; Geol 154; Math 101; Phil 192; Psyc 115, 121; and Stat 104. Students are normally provided the opportunity to participate in field research conducted each summer by anthropological field schools in states of the American West. Opportunities for such research participation in South America are also periodically provided for exceptionally able students selected by the staff member conducting the field research.

Master of Arts in the field of Anthropology.—Prerequisite: a Bachelor of Arts degree with a major in Anthropology from this University, or an equivalent degree.

Required: the general requirements, pages 90–96. The minimum requirement consists of 24 semester hours of Anthropology courses plus a thesis (equivalent to 6 semester hours). A thesis is preferred; however, under certain circumstances, with the approval of the Department, students may elect a program of study of 36 semester hours of Anthropology courses without a thesis. There are no specific required courses; however, the student's program must cover the major areas of anthropological interest which have been approved in advance by the Department graduate adviser. A reading knowledge examination in one foreign language must be passed before completion of 15 semester hours of course work. Students who are writing a thesis must take the Master's Comprehensive Examination before registration for the second half of thesis work.

Departmental prerequisite: Anth 1–2 is prerequisite to all other courses in Anthropology except Anth 158 and 162. This prerequisite may be waived by permission of the instructor for some courses in the Anth 170 series.

FIRST GROUP

Staff

1–2 Introductory Anthropology (3–3)

Anth 1: survey of man's origin, physical evolution, and culture history. Anth 2: survey of the world's cultures, illustrating the principles of cultural behavior. (Anth 1: fall—day and evening; spring—day. Anth 2: fall—day; spring—day and evening.)

SECOND GROUP

Krulfeld

150 Comparative Value Systems (3)

Examination of world views, conceptual systems, and value orientations of representative cultures throughout the world. (1971–72 and alternate years: fall—day)

Krulfeld

151 Primitive Economics (3)

Comparative study of various economic organizations, including hunters and gatherers, herders and cultivators. (Spring—day)

Humphrey

152 Man, Culture, and Environment (3)

Basic principles of cultural ecology. Man's interaction with the ecosystem both past and present; emphasis on the application of anthropological precepts to current environmental problems. (1972–73 and alternate years: spring—day)

153 **Psychological Anthropology** (3) McKay

Relevance of psychological theories to human evolution and the cross-cultural study of personality. Cultural determinants of personality formation and mental health. (Fall—day)

154 **Mythology and Folklore** (3) Golla

Unwritten literature as an expression of imaginative and creative thought; the place of mythology and folklore in social organization, in enculturation, and in social control. (Spring—evening)

155 **Primitive Religion** (3) Brownrigg

Conceptions of the supernatural in nonliterate societies. Examination of religious beliefs and practices. Emphasis on states of consciousness. (Fall—evening)

157 **Primitive Social Organization** (3) Simons

The analysis of the social organization of primitive peoples; kinship, economic, and political systems. (Fall—day)

158 **Art and Culture** (3) Krulfeld

Study of the art of tribal society, including the role of art in culture, influences upon the artist, and beliefs and practices associated with art production. (Spring—day)

159 **Ethnoscience** (3) Golla

Comparative study of branches of knowledge, such as astronomy, botany, mathematics, psychology, technology, and zoology, as these are empirically derived and systematically arranged in selected preindustrial societies. (1971–72 and alternate years: fall—day)

161 **Language and Culture** (3) Golla

Structure and semantics of systems of human communication; linguistic change; influence of language on world view. (Fall—day)

162 **Linguistics in Anthropology** (3) Golla

Introduction to general (descriptive and comparative) linguistics. (Spring—day)

170 **Cultures of the Caribbean** (3) Staff

Study of the culture history and ways of life of the various cultural groups of the area up to the ethnographic present. (1971–72 and alternate years: spring—day)

171 **Native Peoples of North America** (3) Humphrey

Comparative study of Indian groups representative of each of the culture areas of the continent. (1972–73 and alternate years: fall—day)

172 **Native Peoples of South America** (3) Brownrigg

Survey of Indian groups representative of each of the culture areas of the continent. Hacienda, plantation, and urban adaptations of Indian and African groups. (Fall—day)

173 **Cultures of the Pacific** (3) Lewis

Study of the culture history and ways of the life of the native peoples of Melanesia, Micronesia, and Polynesia. (1972–73 and alternate years: fall—day)

174 **Far Eastern Communities** (3) Krulfeld

Study of social organizations, religions, economies, and problems of current anthropological interest for cultures of the Far East, including Japan, Korea, China, and India. (1972–73 and alternate years: spring—day)

175 **Cultures of Southeast Asia** (3) Krulfeld

Study of representative Southeast Asian cultures from primitive groups to high civilizations. (1972–73 and alternate years: spring—day)

176 **Cultures of the Circumpolar Region** (3) Humphrey

Survey of the social and economic adaptations to an extreme climate made by peoples of the northern sub-arctic and arctic regions of North America and Eurasia. (Fall—day)

177 **Cultures of the Near East** (3) Lewis

Study of the geographic environment, language, religion, and social structure of settled and nomadic peoples of the Near East; emphasis on the Arab world. (1972–73 and alternate years: spring—day)

178 **Cultures of South and East Africa** (3) Lewis

Comparative examination of the history, cultural development, and contemporary problems of cultures of southern and eastern Negro Africa. (Fall—day)

179 **Cultures of West and Central Africa** (3) Lewis

Comparative examination of the history, cultural development, and contemporary problems of cultures of western and central Negro Africa. (Spring—day)

182 **New World Archeology** (3) Humphrey

Survey of North American culture history from man's entry into the Americas during the Pleistocene period until the time of the first European contacts. (Spring—day)

183 **Old World Archeology** (3) Humphrey

Survey of human prehistory in Europe, Africa, and Asia from the earliest hominid cultures to the beginnings of advanced agricultural civilizations and their secondary centers. (Fall—day)

185 **Latin American Archeology** (3) Humphrey

The culture history of pre-Columbian Mexico and Central America from the Paleo-Indian period through the Spanish Conquest, emphasizing the origin and development of Latin American high civilizations. (1972–73 and alternate years: spring—day)

186 **Physical Anthropology** (3) Angel

Study of human variation past and present, seen as a product of physical and cultural evolution. (Spring—evening)

192 **Anthropological Theory** (3) Krulfeld, Brownrigg

Analysis of the theoretical postulates and assumptions underlying the development of modern cultural anthropology. (Fall and spring—day)

193 **Anthropological Methods** (3) Krulfeld

Approaches to library and field research. Conceptual bases and bias in the delineation of problems; in the selection, analysis, and organization of

data; and in the preparation of the final report. (1972–73 and alternate years: spring—day)

THIRD GROUP

201 **Seminar: Recent Trends in Anthropology** (3) Staff

Major topics of interest in contemporary anthropology since the mid-20th century will be taken up in order, stressing current journal and monograph materials. (Fall—day)

261 **Field Methods in Linguistics** (3) Golla

Principles of interviewing and recording various linguistic dialects; techniques of observation of cultural variables which influence linguistic choice. (Spring—day)

262 **Seminar: Applied Anthropology** (3) Brownrigg

Use of anthropological methods and techniques in such specific fields as government, community development, land reform, law, and medicine. (Spring—day)

263 **Seminar: Culture Contact and Change** (3) Simons

Western impact on non-Western cultures. Workings and processes of social change as variant cultures and ethical systems interact. (1971–72 and alternate years: fall—day)

264 **Seminar: Museum Techniques** (3) Humphrey

Principles of collection, classification, preservation, identification, and interpretation of specimens; presentation to the public of the cultural significance of prepared specimens; research and instructional use of the museum. Field trips to area museums. (Fall—day)

265 **Seminar: Method and Theory in Archeology** (3) Humphrey

Analysis of field techniques, dating methods, and theoretical approaches in reconstructing and interpreting the cultures of the past, utilizing the most recent archeological techniques. (Spring—day)

266 **Seminar: Technology** (3) Humphrey

Cross-cultural examination of the form, function, meaning, and use of material culture and the behavior patterns involved in its production. (1972–73 and alternate years: spring—day)

267 **Seminar: Economic Anthropology** (3) Krulfeld

Comparative study of preindustrial systems of production, distribution, and consumption. (Spring—day)

268 **Seminar: Peasant Society** (3) Krulfeld

Cross-cultural analysis of peasant societies, including an examination of their manner of functioning within their larger social, economic, and cultural context.

269 **Seminar: Structural Problems** (3) Simons

Comparative survey of principles of descent, kinship terminology, and formation of descent groups; problems of variation and change in kinship systems and development of kinship models. (Spring—day)

*270 **Problems of Museum Work** (3)
Selected museum problems in the fine arts and social sciences; topic to be determined by instructor each time the course is offered. Problems to be considered include communication through museum exhibits, museum education, conservation, administration, etc. Prerequisite: Anth 264. May be repeated for credit. Topic to be announced in *Schedule of Classes.* (Fall—day)

273 **Seminar: Culture of Poverty** (3) Brownrigg
Cross-cultural consideration of basic assumptions about the life of the poor within pluralistic societies with the aim of gaining theoretical insights into the nature of culture itself. (1972–73 and alternate years: spring—day)

274 **Seminar: Afro-American Culture** (3) McKay
An ethnographic survey of racial, linguistic, and cultural attributes of Americans of African ancestry. African antecedents, conditions of migration, experiences in slave and free communities over their 350-year history in the United States. (Spring—day)

282 **Seminar: Advanced Archeology—North American Prehistory** (3) Humphrey
Analysis in depth of current archeological problems relating to the origin and development of aboriginal American cultures. (Spring—day)

283 **Seminar: Advanced Archeology—Old World** (3) Staff
Study, in detail, of the beginnings of human culture and the development of civilization in the Old World. (1971–72 and alternate years: spring—day)

287 **Seminar: Problems in Latin American Civilization** (3) Rodríguez
Interdisciplinary seminar guided by a specialist within the methodology of his chosen discipline; each student writes a report on some aspects of a key theme (i.e., Nationalism) in Latin America's experience. Admission by permission of instructor. (Spring—day)

295 **Research** (arr.) Staff
May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3)
(Fall and spring)

Art

Professors D.C. Kline, W.A. MacDonald, L.P. Leite *(Chairman)*
Professorial Lecturer Grace Evans
Associate Professors Roland Fleischer, F.S. Grubar, D.H. Teller
Assistant Professors H.I. Gates, Lilien Hamilton, W.T. Woodward, Fuller Griffith, J.F. Wright, Jr., J.L. Lake *(Photography)*
Assistant Professorial Lecturers Barbara Braun, H.L. Glicksman
Lecturer Jane Kofler

* An interdepartmental course offered by the departments of Anthropology and Art.

Faculty of the Corcoran School of Art: Roy Slade *(Dean)*, Harold Baskin, William Christenberry, Donald Corrigan, William Dutterer, Robert Epstein, Robert Foster, Eugene Frederick, Samuel Holvey, Jerry Lake, Blaine Larson, Jack Lefkowitz, William Lombardo, Krystyna Marek, Ed McGowin, Christopher Muhlert, Robert Newmann, Ramon Osuna, Jack Perlmutter, Alexander Russo, Paul Salmon, Charles Scheer, Berthold Schmutzhart, Rona Slade, A. Brockie Stevenson, Joseph Taney, Elliott Thompson, James Twitty

Bachelor of Arts with a major in Art History and Theory (Departmental).—Prerequisite: the Arts and Letters curriculum, page 76, or equivalent, including Art 31–32.

Required: the general requirements, pages 81–85; 21 semester hours, as follows: Art 101 or 102, 104 or 105, 109 or 110, 112, 113 or 114, 117 or 118, 137. In addition, 9 semester hours selected from second-group courses, or from third-group courses open to undergraduates with the approval of the instructor. Phil 162 is recommended as a senior-year elective. Students intending to major in this field are urged to acquire a reading knowledge of a foreign language, preferably German or French, at the earliest possible convenience. Those who plan to do advanced work in Classical Archeology are advised to study Greek and Latin in addition.

Art History and Theory majors may apply for graduation with Special Honors. In order to be accepted to this program, students must apply in writing to the Chairman of the Department, fulfill the general requirements (see page 50), and, prior to admission to the program, pass a reading examination in either French or German administered by the Department of Art. Upon acceptance, the student will be assigned one or more faculty advisers under whose direction he will undertake a supervised program of selected reading on which he will be required to submit written, critical reports.

Bachelor of Arts with a major in Fine Arts (Departmental).—Prerequisite: the Arts and Letters curriculum, page 76, or equivalent, including Art 21–22 and 31–32.

Required: in addition to the general requirements, pages 81–85, 27 semester hours in Fine Arts; Phil 162 or equivalent; 6 hours of Art History selected from second-group courses or from third-group courses open to undergraduates with the approval of the instructor. A maximum of 12 of the required 27 hours in Fine Arts may be taken in any one of the following fields: painting, design, sculpture, graphics, and ceramics; the remainder are to be selected from three of these fields.

Fine Arts majors may apply for graduation with Special Honors. In order to be accepted to this program students must apply in writing to the Chairman of the Department and fulfill the general requirements (see page 50). Upon acceptance, the student will be assigned a faculty adviser(s) to direct a project which will be assigned to him in his special area of interest. At the conclusion of the project, the student will present a one-man exhibit prepared exclusively outside of class, and he will be examined by an Honors Board.

Bachelor of Arts with a major in Classical Archeology and Greek (Departmental).—This interdepartmental major may be arranged in conjunction with the Department of Classics. Prerequisite: the Arts and Letters curriculum, page 76, including Clas 13–14 and Hist 39–40.

Required: the general requirements, pages 81–85, including 12 semester hours of second-group courses in Greek; Clas 137–38; Art 101, 102, 103, 111; Hist 109, 110; Phil 111. A reading knowledge of French or German is recommended.

Master of Arts in the field of Art History and Theory with concentrations in Classical Art and Archeology, American Art, Renaissance and Baroque Art, and *Contemporary Art.*—Prerequisite: a Bachelor of Arts degree with a major in Art History and Theory from this University, or an equivalent degree. Applicants from other institutions must present scores on the Graduate Record Examination to the Office of the Graduate School of Arts and Sciences.

Required: the general requirements, pages 90–96. As many as possible of the 24 semester hours in course work should be third-group courses. The courses must be

completed in 6 semesters or less, with a grade of *A* in at least 6 semester hours of work, and with an overall quality-point index of at least 3.25. A reading knowledge examination, preferably in German or French, must be passed after completing 9 semester hours of course work. A general written Master's Comprehensive Examination on the problems in the field of Art History and Theory and a written thesis (equivalent to 6 semester hours) embodying the result of research on some specific topic in the history and theory of art are also required. For details, see the pamphlet on the Master of Arts in the field of Art History and Theory, which is available in the offices of the Chairman of the Department of Art and the Dean of the Graduate School of Arts and Sciences.

Master of Arts in the field of Museology.—Prerequisite: a Bachelor of Arts degree with a major in Art History and Theory from this University, or an equivalent degree.

Required: the general requirements, pages 90–96. Prospective candidates should consult the Department for specific requirements.

Master of Fine Arts in the field of Painting, Sculpture, Ceramics, Design, or Graphics.—Prerequisite: a Bachelor of Arts degree with a major in Fine Arts in the field of Painting, Sculpture, Ceramics, Design, or Graphics from this University, or an equivalent degree.

Required: the general requirements, pages 90–96. In lieu of the foreign language requirement, Master of Fine Arts candidates are required to take 3 additional semester hours of course work selected from Art 137, 181–82; as many as possible of the remaining 24 semester hours of course work should be in third-group courses. A creative thesis (equivalent to 6 semester hours) in painting, sculpture, ceramics, design, or graphics, and a paper discussing some technical phase of the problem illustrated by the thesis are also required.

Bachelor of Arts in Education with a teaching field in Art.—Prerequisite: the Education curriculum, pages 78–79.

Required: the Art option and professional courses listed on pages 106, 115.

ART HISTORY AND THEORY

FIRST GROUP

31–32 Survey of Western Art (3–3) Hamilton and Staff

Survey of the arts in the Western world from prehistoric to modern times. A foundation for further study in the history of art. (Art 31: fall and spring—day. Art 32: fall and spring—day and evening.)

71–72 Introduction to the Arts in America (3–3) Kline, Grubar

Painting, sculpture, and architecture of America, with selected references to crafts and popular arts. Art 71: from Colonial beginnings to the Republican Age. Art 72: from early 19th century to the present. (Academic year—day and evening)

SECOND GROUP

101 Greek and Roman Architecture (3) MacDonald

(Fall—day)

102 Greek and Roman Sculpture (3) MacDonald

(Spring—day)

103 Classical Iconography (3) MacDonald

Origin and development of myths in classical art.

104 **Renaissance Art in Italy I** (3) **Evans**
Early developments from the 13th to the 15th century. (Fall—day)

105 **Renaissance Art in Italy II** (3) **Leite**
High Renaissance and Mannerism. (Spring—day)

106 **Renaissance Art in the North I** (3) **Fleischer**
Fifteenth century painting in the Netherlands, Germany, France, and Spain. (Fall—day)

107 **Renaissance Art in the North II** (3) **Fleischer**
Sixteenth century painting in the Netherlands, Germany, France, and Spain. (Spring—evening)

108 **18th Century Art in Europe** (3) **Fleischer**
Development of painting, sculpture, and architecture. (Fall—day)

109 **19th Century Art in Europe** (3) **Leite, Hamilton**
Painting and sculpture. (Fall—day)

110 **Contemporary Art** (3) **Leite**
Painting and sculpture in 20th century Europe. (Fall—day)

111 **Classical Archeology** (3) **MacDonald**
Archeological monuments of classical civilizations, with intensive study of one or more areas selected from architecture, sculpture, painting, or minor arts. (Fall—day)

112 **Art of Egypt and the Ancient Orient** (3) **MacDonald**
Study of the art of Mesopotamia, Anatolia, Egypt, and Persia. (Spring—day)

113 **Baroque Art in Italy** (3) **Leite**
Development of painting, sculpture, and architecture in 16th and 17th century Italy.

114 **Baroque Art in the North** (3) **Fleischer**
Development in painting, sculpture, and architecture in the 16th and 17th centuries in Holland, Flanders, Spain, France, Germany, and England. (Spring—day)

115 **Christian Iconography** (3) **Leite**
Origins and development of Christian symbols and themes from early Christian to modern times.

117 **Medieval Art I** (3) **Evans**
Architecture, sculpture, and painting of the early Christian and Byzantine periods. (Fall—day)

118 **Medieval Art II** (3) **Evans**
Architecture, sculpture, and painting of the Romanesque and Gothic periods. (Spring—day)

119 **Pre-Romanesque Art in the North** (3) **Evans**
The Carolingian and Merovingian periods. (Spring—day)

Kline

120 **Art of China and Japan** (3)
Architecture, painting, and sculpture of China, Korea, and Japan. (Fall—day)

Kline

145 **Folk Arts in America** (3)
Ceramics, woodcarving, ironwork, decorative painting, weaving, and other crafts. (Fall—day)

Braun

147 **Pre-Columbian Art** (3)
An introduction to pre-Columbian art in Mexico, Central America, and South America from its beginnings to the Spanish conquest. Examination of architecture, sculpture, ceramics, and painting of the great civilizations of the Olmec, Teotihuacan, Maya, Aztec, Chavín, Mochica, and Inca.

Grubar

148 **19th Century American Painting** (3)
(Fall—day)

Grubar

149 **19th Century American Sculpture** (3)
(Spring—day)

THIRD GROUP

Glicksman

201 **Principles of Museum Work** (3)
A required introductory course for graduate study in museology. Field trips to galleries and museums. History and development of museums; problems of museum administration, connoisseurship, cataloguing, installation, conservation, and educational service. (Fall and spring—evening)

Kline

*203 **Primitive Art** (3)
Arts of prehistoric and primitive man in Europe, the pre-Columbian Americas, Oceania, and Africa. (Spring—day)

Kline

*207 **Modern Architecture** (3)
Development of modern architecture and building technology in Europe and America from the late 19th century to the present.

Evans

216 **Medieval Painting** (3)
Painting and the decorative arts.

Fleischer, Leite

220 **Seminar: Baroque Art of the 17th Century** (3)
Specific area announced in *Schedule of Classes*. A reading knowledge of Italian is desirable for the Italian area and German for the northern area. (Fall—day)

Fleischer, Leite

221 **Seminar: Renaissance Art** (3)
Specific area announced in *Schedule of Classes*. A reading knowledge of Italian is desirable for the Italian area and German for the northern area. (Fall—day)

Kline, Grubar

243 **Seminar: American Art** (3)
Specific area announced in *Schedule of Classes*. (Fall—day)

* May be taken for undergraduate credit with the approval of the instructor.

244 **Seminar: 19th Century Art** (3) Grubar, Leite
Specific area announced in *Schedule of Classes.* Reading knowledge of French desirable when specified area is European. (Fall—day)

245 **Seminar: 20th Century Art** (3) Grubar, Leite
Specific area announced in *Schedule of Classes.* (Spring—evening)

246 **Seminar: Classical Art** (3) MacDonald
Specific area announced in *Schedule of Classes.* (Spring—day)

247 **Seminar: Medieval Art** (3) Evans
(Fall—evening)

248 **Independent Research** (3)
Open only to Master's degree candidates. To be arranged in consultation with individual instructors. May be repeated for credit. (Fall and spring)

261 **Seminar: Problems in Art History** (3) Staff
As determined by the instructor, this course will deal with the theory, criticism, or methodology of art history. May be repeated for credit. Topic to be announced in *Schedule of Classes.* (Fall—day)

263–64 **Research Seminar in American Art** (3–3)
Selected themes offered in conjunction with the National Collection of Fine Arts and the Smithsonian Institution. Open to students admitted to graduate study in the field of Art History and Theory with a concentration in American Art. Registration only after consultation with the Department Chairman.

*270 **Problems of Museum Work** (3) Staff
Selected museum problems in the fine arts and social sciences; topic to be determined by instructor each time the course is offered. Problems to be considered include communication through museum exhibits, museum education, conservation, administration, etc. Prerequisite: Art 201. May be repeated for credit. Topic to be announced in *Schedule of Classes.* (Fall—day)

271–72 **Museum Techniques** (6–6) Staff
Intern training in museum work. Prerequisite: Art 201, 270. (Academic year—4 hours daily, Monday through Friday)

287–88 **Thesis Research: Museology** (3–3) Staff
(Fall and spring)

289–90 **Thesis Research** (3–3) Staff
(Fall and spring)

NE ARTS

...nless otherwise indicated, Fine Arts courses taught in University studios carry no ...terial or laboratory fees; students must purchase their own materials. Laboratory and material fees for courses taught at the Corcoran School of Art are stated ...the course description and are payable at the School.

...n interdepartmental course offered by the departments of Art and Anthropology.

Courses taught at the Corcoran School of Art have the designation "Corcoran Faculty" for the instructor.

Departmental prerequisite: Art 21–22 or permission of Department Chairman is prerequisite to all other studio courses in Art.

FIRST GROUP

Staff

*21–22 **Design I: Basic** (3–3)

Fundamental studies of principles and elements of design. Art 21: study of two-dimensional design. Art 22: three-dimensional studies. (Art 21: fall and spring—day and evening. Art 22: fall—day; spring—day and evening.)

Wright

41–42 **Drawing I** (3–3)

Concepts of drawing, traditional and contemporary; training in perception, analysis of form, use of media, and exercises in connoisseurship. Material and model fee, $12 a semester. (Art 41: fall and spring—day and evening. Art 42: fall—day; spring—day and evening.)

Corcoran Faculty

51–52 **Ceramics I** (3–3)

Basic techniques for clay preparation, hand forming, wheel throwing, and the application of slip glazes and vitreous glazes through workshop and illustrated lectures. Laboratory fee, $45 a semester. (Academic year—day and evening)

Griffith, Wright

57–58 **Graphics I** (3–3)

Exploration of the methods of intaglio, relief, printing, and other composite processes. (Academic year—day and evening)

Corcoran Faculty

61–62 **Water Color** (3–3)

Painting and experimentation in transparent and opaque water color. (Academic year—day)

Corcoran Faculty

65–66 **Painting I** (3–3)

Experimentation with painting. Color theory and analysis. (Academic year—day and evening)

Gates

81–82 **Sculpture I** (3–3)

Three-dimensional design. Basic sculptural techniques; modeling, carving, and construction. Media include wood, clay, stone, plaster. (Academic year—day and evening)

SECOND GROUP

Second-group Art courses may be repeated for credit with approval of Department.

Staff

†121–22 **Design II: Structured** (3 or 6–3 or 6)

Structured course extending the student's design experience through a series of problems in both two- and three-dimensional media. Students spend a portion of each semester with each Fine Arts *campus* staff member experimenting with a wide variety of Fine Arts materials and techniques. (Academic year)

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* Required of all Fine Arts majors.

† Fine Arts majors with concentrations in design may elect 6 semester hours of credit

123–24 **Design III: Individual Problems** (3–3) Staff

Emphasis on the individual student and the problems and materials that specifically interest him in any area of design. (Academic year)

*125–26 **Painting II** (3 or 6–3 or 6) Corcoran Faculty

Concepts of painting. Attitudes, approaches, personal statements. (Academic year—day and evening)

*127–28 **Painting III** (3 or 6–3 of 6) Woodward

Exploration of problems in developing a personal visual imagery. Material and model fee, $12 a semester. (Academic year—day)

*131–32 **Ceramics II** (3 or 6–3 or 6) Corcoran Faculty

Basic techniques in clay and glaze formation, advanced wheel throwing and hand forming. Laboratory fee each semester: $45 for 3 semester hours; $60 for 6 semester hours. (Academic year—day and evening)

135–36 **Advanced Water Color** (3–3) Corcoran Faculty

Use of opaque and transparent water color leading to individual development with concentration on special projects. (Academic year—day)

137 **Workshop in Materials, Methods, and Techniques** (3) Woodward

Drawing in charcoal, crayon, and pen; painting and preparation of grounds for tempera, encaustic, fresco buono, oil, watercolor, polymer, and mixed techniques; graphic techniques in woodcut, engraving, etching; modeling in clay and carving in wood and stone; mosaic. Material and model fee, $2. (Fall and spring—day)

143–44 **Serigraphy** (3–3) Teller

Advanced problems in serigraphy; emphasis on its aesthetic possibilities. Prerequisite: Art 57–58. (Academic year—day)

*151–52 **Ceramics III** (3 or 6–3 or 6) Corcoran Faculty

Glaze calculation, experimentation in reduction firing, individual problems in formation techniques, and problems in series production for the studio artist. Advanced decorating and finishing techniques. Laboratory fee each semester: $45 for 3 semester hours; $60 for 6 semester hours. (Academic year—day and evening)

*153–54 **Graphics II** (3 or 6–3 or 6) Griffith, Wright

Advanced relief, intaglio, and other composite processes. Prerequisite: Art 57–58. (Academic year—day)

*157–58 **Graphics III** (3 or 6–3 or 6) Griffith

Exploration of combined techniques and mixed media. Prerequisite: Art 153–54. (Academic year—day)

159–60 **Drawing II** (3–3) Corcoran Faculty

Development of drawing. Individual study, application and extensions of drawing. (Academic year—day and evening)

* Fine Arts majors and Master of Fine Arts candidates should elect 6 semester hours of credit.

161–62 **Fundamentals of Photography** (3–3) Lake
Study of the fundamental techniques of photography; emphasis on creative expression. Prerequisite to Art 162: Art 161 or permission of instructor. Laboratory fee, $25 a semester, nonrefundable. (Academic year—day)

163–64 **Design: Visual Communication** (3–3) Corcoran Faculty
(Replaces former Art 167)
Development of concepts and layouts—incorporating typography and illustrations or photographs—for brochures, bookjackets, displays, title graphics for film media, etc. (Academic year—day and evening)

165–66 **Design: Advanced Visual Communication** (3–3) Corcoran Faculty
(Replaces former Art 168)
Development of graphic designs, layouts, professional formats for magazine spreads, posters, advertisements, trademarks, letterheads, packages. Development of professional portfolio. (Academic year—day and evening)

167–68 **Design: Typography** (3–3) Corcoran Faculty
(Replaces former Art 169)
Imaginative use of words and the integration of words and pictures in graphic design for advertising, etc.; study of type styles, methods, and specification writing. (Academic year—day)

169–70 **Design: Typography and Illustration** (3–3) Corcoran Faculty
(Replaces former Art 170)
Experimentation with various illustration techniques in advertising and editorial design. Special problems in typography; study of reproduction processes; preparation of art work for printing. (Academic year—day)

171–72 **Calligraphy and Lettering** (3–3) Corcoran Faculty
Consideration of the basic alphabets and their use in calligraphy, lettering, and typography. (Academic year—day)

173–74 **Advanced Calligraphy and Lettering** (3–3) Corcoran Faculty
Design and appropriate use of present-day letter forms. Consideration of type faces and use in contemporary typography. (Academic year—day)

175–76 **Design Projects** (3–3) Corcoran Faculty
Advanced general design problems in two, three, and four dimensions. Unusual media and techniques; pure concept problems stressed. (Academic year—day)

177–78 **Survey of Illustration** (3–3) Corcoran Faculty
(Formerly Rendering)
For future designers. Exposure to a maximum range of illustrative processes, both practical and theoretical; current illustration trends, changes in illustration, special personal styles; general critiques, including students' verbal defense or criticism. (Academic year—day)

*179–80 **Sculpture II** (3 or 6–3 or 6) Gates
Concepts of sculpture; new materials and developments. (Academic year—day)

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* Fine Arts majors and Master of Fine Arts candidates should elect 6 semester hours of credit.

185–86 **Painting and Drawing** (3–3) Corcoran Faculty
(Formerly Art 165–66 Composition)
Critical study of design and representation in painting and drawing. Relationship to aesthetic potential. (Art 185: fall—evening. Art 186: spring—day and evening.)

*189–90 **Sculpture III** (3 or 6–3 or 6) Gates
Advanced study concentrating on relevance of scale and media. Relationship of sculpture to the environment. (Academic year)

191 **Advanced Photography** (3) Lake
Advanced problems in photography; emphasis on creative expression and individual development. Prerequisite: Art 162 or permission of instructor. Laboratory fee, $25, nonrefundable. (Fall—day)

192 **Advanced Photography: Individual Problems** (3) Lake
Project of the student's choice, subject to prior written approval by instructor. Prerequisite: Art 162 or 191, or permission of instructor. Laboratory fee, $25, nonrefundable. (Spring—day)

193 **Film Making** (3) Corcoran Faculty
Designed for the student with limited knowledge of the techniques and procedures in film making. The student will create his own short film. Laboratory fee, $90. (Fall and spring—evening)

THIRD GROUP

All third-group Art courses may be repeated for credit with the approval of the Department.

*231–32 **Design IV** (3 or 6–3 or 6) Gates
New media and techniques in three-dimensional design. (Academic year)

*234 **Design V** (3 or 6) Staff
Presentation, model building, and specifications of materials in three-dimensional problems. (Fall and spring)

*235 **Design VI** (3 or 6) Teller
Designing and executing textiles using the techniques of silk screen, block print, and batik. (Fall and spring)

249 **Theory of Design** (3) Teller
Application of design principles to painting, architecture, sculpture, and minor arts of today. Relationship of design principles to the contemporary artist and his work. Open to undergraduate students with permission of instructor. (Fall—day)

*251–52 **Ceramics IV** (3 or 6–3 or 6) Corcoran Faculty
Personal glaze and clay formulation. Methods of instruction for the student who plans to teach. Laboratory fee each semester: $45 for 3 semester hours; $60 for 6 semester hours. (Academic year—day and evening)

* Fine Arts majors and Master of Fine Arts candidates should elect 6 semester hours of credit.

*253 **Ceramics V** (3 or 6) — Corcoran Faculty
Laboratory fee: $45 for 3 semester hours; $60 for 6 semester hours. (Fall and spring)

*255–56 **Graphics IV: Serigraphy** (3 or 6–3 or 6) — Teller
Prerequisite: Art 157–58. (Academic year)

*257–58 **Graphics V: Etching and Engraving** (3 or 6–3 or 6) — Griffith
Prerequisite: Art 157–58. (Academic year)

*259 **Graphics VI: Lithography** (3 or 6) — Wright
(Fall and spring)

*260 **Graphics VII: Relief Printing** (3 or 6) — Griffith
(Fall and spring)

*265–66 **Painting IV** (3 or 6–3 or 6) — Woodward
Creative painting; students work on independent projects as well as assigned problems. Material and model fee, $12 a semester. (Academic year—evening)

267–68 **Individual Problems in Photography** (3–3) — Corcoran Faculty
Students submit to the instructor a written proposal outlining the project to be explored during the semester. Instruction and professional guidance relevant to individual projects. Prerequisite: two years of photography and written permission of instructor. Laboratory fee, $25 a semester. (Academic year—day)

*275 **Painting V** (3 or 6) — Woodward
(Fall or spring)

*279–80 **Sculpture IV** (3 or 6–3 or 6) — Gates
(Academic year)

*281 **Sculpture V** (3 or 6) — Gates
(Fall and spring)

299–300 **Thesis Research** (3–3) — Staff
(Fall and spring)

Astronomy

See "Physics."

Biochemistry

Professors C.R. Treadwell *(Chairman)*, B.W. Smith, G.V. Vahouny, J.M. Bailey
Professorial Lecturers W.W. Burr, Jr. *(Isotopes)*, R.W. Albers *(Brain)*, Roscoe Brady, Jr. *(Brain)*, Arnold Schaefer, Edward Steers, Jr., W.F. Anderson *(Genetics)*, H.L. Ozer, Gordon Guroff, Martin Flavin, A.N. Schechter

* Fine Arts majors and Master of Fine Arts candidates should elect 6 semester hours of credit.

Assistant Professors Glenn Walker, Linda Gallo *(Research)*, Barbara Howard *(Research)*
Lecturer P.H. Fishman
Special Lecturers Walter Mertz *(Inorganic Metabolism)*, J.C. Smith, Jr.

Master of Science in the field of Biochemistry.—Prerequisite: a Bachelor's degree. The undergraduate program must have included the following courses, or equivalent: B Sc 11–12; Chem 11–12, 22, 51–52, 53–54; Phys 1, 2.

Required: the general requirements, pages 90–96, including Bioc 221–22, 227, 299–300. The remaining courses are to be selected from Bioc 224, 232, 241, 262, 295; or, with the approval of the adviser, from graduate courses in Chemistry, Microbiology, Physiology, or Pharmacology. It is usually not possible to arrange courses and research so that the student can be assured of completing all of the required work in one academic year.

Master of Science in the field of Mycology.—An interdepartmental degree offered by the departments of Biochemistry, Epidemiology and Environmental Health, and Microbiology.

Prerequisite: a Bachelor's degree with a major in Biology, Botany, Chemistry, or Zoology from this University, or an equivalent degree. The undergraduate program should have included the following courses, or equivalent: B Sc 11–12; Chem 11–12, 51–52, 53–54.

Required: the general requirements, pages 90–96. Candidates must complete either (1) a minimum of 33 semester hours including Bioc 299–300 *Thesis Research*, or (2) a minimum of 39 semester hours without a thesis. The required courses in this program are Bioc 221–22; Epid 201, 217, 230 (2 semester hours); Micr 201, 225, 231.

Doctor of Philosophy in the field of Biochemistry.—Required: the general requirements, pages 90–94, 96–98.

Research fields: Amino Acid Metabolism; Animal Nutrition; Biochemical Evolution; Biochemistry of Cancer; Biochemistry of Tissue Culture; Carbohydrate Metabolism; Chemistry and Metabolism of Carbyhydrates, Lipids, Proteins; Complex Lipids; Endrocrinology; Intermediary Metabolism; Lipids; Metabolic Relationships of Insulin; Metabolism; Metabolism of Connective Tissue; Metabolism of Purines and Pyrimidines; Nutrition; Protein Biosynthesis; Protein Metabolism; Tissue Respiration; and Vitamins.

221–22 **General Biochemistry** (4–4) Vahouny

Lectures and laboratory. Prerequisite: Chem 52, 54. Material fee, $20 a semester. (Academic year—day)

224 **Biochemistry of Enzymes** (1)

Biochemistry of enzymes and enzyme reactions. Prerequisite: Bioc 221. (Spring—day)

225 **Biochemical Procedures** (3) B. Smith and Staff

Laboratory course. Material fee, $16. Content differs each time course is offered; may be repeated for credit. (Fall and spring)

227 **Biochemistry Seminar** (1) Staff

Current literature in biochemistry. Content differs each time course is offered; may be repeated for credit. (Fall and spring—day)

232 **Proteins and Amino Acids** (1) Steers

Prerequisite: Bioc 221. (Spring—Saturday morning)

241 **Isotopes** (3) Burr

Theoretical characterization of isotopes and their applications in biology. Attention given to counting, health physics and radiation safety, autoradiography, chromatography. Laboratory fee, $16. (Spring—day)

251 **Carbohydrate Metabolism** (1)

Prerequisite: Bioc 222. (1971–72 and alternate years: spring—day)

252 **Biochemistry of the Brain** (1) Albers, Brady

For medical students; open to limited number of graduate students. Recent biochemical developments in structure, functions, and metabolic processes unique to the brain. (Spring—day)

254 **Human Nutrition** (1)

For medical students; open to limited number of graduate students. Application of nutritional principles in humans. (Spring—day)

256 **Biochemistry of Organ Function** (1) N. Kramer*

For medical students; open to limited number of graduate students. Emphasis on biochemical processes unique to particular organ systems; application of these processes to evaluation of function. (Spring—day)

258 **Inherited Metabolic Diseases** (1) Ozer

For medical students; open to limited number of graduate students. Contribution of molecular biology to understanding of human mutations and hereditary diseases. Specific disease states and genetics of protein structure discussed. Prerequisite: Bioc 222. (Spring—Saturday morning)

260 **Biochemistry of the Steroids** (1) O. Dodek†

For medical students; open to limited number of graduate students. Basic chemistry of the steroids, pathways of biosynthesis and metabolism, regulatory mechanisms, physiologic effects, clinical measurement of endogenous steroids, clinical manifestations of steroid imbalance, steroid changes in pregnancy, and steroid therapy. (Spring—day)

262 **Biochemistry of the Lipids** (1) Vahouny

1971–72 and alternate years: chemistry, properties, occurrence of important classes of biological lipids. 1972–73 and alternate years: metabolism of lipids, including digestion, energy production, biosynthesis, function in specialized tissues and subcellular structures. Content differs each time course is offered; may be repeated for credit. (Spring)

266 **Biochemical Genetics** (1) Anderson

For medical students; open to limited number of graduate students. (Spring—Saturday morning)

295 **Research in Biochemistry** (arr.) Staff

Participation in a project under investigation in the Department or one in a related field suggested by the student and approved by the Staff. Content differs each time course is offered; may be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

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* Dr. Kramer is Associate Professor of Medicine in the School of Medicine.
† Dr. Dodek is Assistant Clinical Professor of Obstetrics and Gynecology in the School of Medicine.

398 **Advanced Reading and Research** (arr.) **Staff**

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) **Staff**

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Biological Sciences

Professors I.B. Hansen, Edith Mortensen, S.C. Munson, A.H. Desmond *(Chairman)*, R.L. Weintraub
Adjunct Professors T.E. Bowman, M.L. Jones, L.S. Kornicker, H.A. Rehder, F.A. Chace, Jr., Raymond Manning
Professorial Lecturers K.C. Kates, L.B. Smith, R.S. Sigafoos, W.A. Shropshire, Jr.
Associate Professors Caroline Adams, Kittie Parker, S.O. Schiff
Adjunct Associate Professors R.F. Cressey, W.D. Hope, D.L. Pawson, Joseph Rosewater, C.F. Roper, C.G. McWright, Mary Rice
Associate Professorial Lecturer J.R. Buchheit
Assistant Professors W.G. Nash, D.L. Atkins, Henry Merchant, R.K. Packer
Adjunct Assistant Professors P.E. Spiegler, M.S. Clark, T.F. Kelleher, Jr.
Assistant Professorial Lecturer Jessie Dickens
Instructor Bernice Radovich
Lecturers Barbara Timberlake, Lois Earll, Dee Ann Houston, D.A. Crouthamel, Clare Crandall

Bachelor of Arts or *Bachelor of Science with a major in Biology, Botany,* or *Zoology (Departmental).*—Prerequisite: the Arts and Letters or the Science curriculum, respectively, pages 76–77, including B Sc 11–12, or equivalent; Chem 11–12; Chem 51–52 and 53–54, or 50. Phys 1, 2; Math 30, 31 strongly recommended.

Required: the general requirements, pages 81–85, including the following:

For the major in Biology—a minimum of 24 semester hours of second-group courses which should include at least 6 hours in Biology, 6 in Botany, 6 in Zoology.

For the major in Botany—a minimum of 24 semester hours of second-group courses in Botany or in a combination of Botany and Biology.

For the major in Zoology—a minimum of 24 semester hours of second-group courses in Zoology or Biology.

Master of Science in the field of Biology, Botany, or *Zoology.*—Prerequisite: a Bachelor's degree with a major in one of the following from this University, or an equivalent degree: (1) *Biology field*—an undergraduate major in Biology, Botany, or Zoology; (2) *Botany field*—an undergraduate major in Botany or Biology; (3) *Zoology field*—an undergraduate major in Zoology or Biology. The undergraduate program must have included the following courses, or equivalent: Chem 51–52 and 53–54, or 50; Math 31; Phys 1, 2.

Required: the general requirements, pages 90–96. The minimum requirement consists of 24 semester hours of approved course work plus a thesis (equivalent to 6 semester hours). With the permission of the Department a student may elect a program of study consisting of 36 semester hours of approved course work without a thesis.

Doctor of Philosophy in the field of Biology, Botany, or *Zoology.*—Required: the general requirements, pages 90–94, 96–98. The program of study is determined in

consultation with the graduate committee of the Department. Each candidate is required to pass the General Examination in four areas which support the field of study selected. The required courses and tool subject options vary with the field of study undertaken.

Research fields in Biology: Cell Physiology, Cytogenetics, Cytology, and Molecular Genetics.

Research fields in Botany: Photobiology, Plant Ecology, Plant Physiology (Microorganisms), Plant Physiology (Vascular Plants), and Taxonomy.

Research fields in Zoology: Animal Ecology; Comparative Physiology; Entomology (Insect Physiology); Herpetology; Histophysiology; Radiation Biology; Taxonomy, Anatomy, and Physiology of Mollusks; Vertebrate Anatomy and Taxonomy; Vertebrate Embryology and Morphogenesis; and Vertebrate Ichthyology.

Doctor of Philosophy in the field of Biophysics (an interdepartmental field offered by the departments of Biological Sciences, Physics, and Physiology), see pages 218–21. See pages 90–94, 96–98, for requirements for the degree.

Bachelor of Arts in Education with a teaching field in Biology.—Prerequisite: the Education curriculum, pages 78–79.

Required: the Biology option and the professional courses listed on pages 107, 115.

Departmental prerequisite: B Sc 11–12 or equivalent is prerequisite to all second-group courses in Biology, Botany, and Zoology, except by permission of the instructor.

BIOLOGY

FIRST GROUP

Schiff

3–4 **Introductory Biology for Nonscience Majors** (3–3)

Lecture (2 hours), laboratory (2 hours). Survey of biological principles; emphasis on man as a functional organism in his environment. Material fee, $12 a semester. (Academic year—day and evening)

Merchant

11–12 **Introductory Biology for Science Majors** (4–4)

Lecture (3 hours), laboratory (3 hours). Biological principles and problems designed to furnish a base for advanced studies in biology and related sciences. Material fee, $15 a semester. (Academic year—day)

SECOND GROUP

Munson

108 **Organic Evolution** (3)

Theories of organic evolution and present ideas on principal lines of development in the plant and animal kingdoms; review of mechanisms involved in the process. (Fall and spring—day)

Weintraub

111 **Introductory Microbiology** (4)

(Formerly B Sc 112 Bacteriology)

Lecture (2 hours), laboratory (4 hours). Survey of the major groups of microorganisms with emphasis on structure, physiology, ecology, phylogenetic relationships, and economic importance. Prerequisite: one year of chemistry. Material fee, $15. (1971–72 and alternate years: fall—day; 1972–73 and alternate years: fall—evening)

Schiff

115 **Cytology** (4)

Lecture (1 hour), laboratory (4 hours). Morphological and physiochemical properties of plant and animal cells and their components.

Analysis of slides, cytological techniques, and preparation of slides. Recommended: one year of chemistry. Material fee, $15.

118 **Advanced Cytology** (3) Schiff

Lecture (1 hour), laboratory (4 hours). Cell mechanisms, including chromosome pairing and movement, bacterial, viral, and human cytogenetics, sex determination, chromosome abnormalities, and cytology of cancer cells. Laboratory will be in the nature of a cytological project, to be selected by the student with the concurrence of the instructor. Prerequisite: B Sc 115. Material fee, $15.

119 **Cell Biochemistry** (4) Weintraub

Lecture (2 hours), laboratory (3 hours). Introduction to composition and metabolism of generalized cells of plants, animals, and microorganisms. Prerequisite: Chem 11–12; 50 or 51–52; or equivalent. Material fee, $15. (1971–72 and alternate years: spring—day)

120 **Cell Physiology** (4) Weintraub

Lecture (2 hours), laboratory (3 hours). Study of cell activities, including differentiation, association, intercellular communication, aging, movement, energy transduction, bioluminescence, and photosynthesis. Prerequisite: one semester of organic chemistry. Material fee, $15. (1972–73 and alternate years: spring—day)

122 **Cell and Molecular Biology** (3) Weintraub

Survey of structure and function of cells of animals, plants, and microorganisms and their subcellular organelles, including study of the processes of cellular absorption, excretion, biosynthesis, growth, and division. Prerequisite: one semester of organic chemistry. (1971–72 and alternate years: fall—evening; 1972–73 and alternate years: fall—day)

127 **Genetics** (4) Nash

Lecture (3 hours), laboratory (2 hours). Introductory course. Basic aspects of transmission of genetic traits with particular reference to the chemical basis of heredity and gene action. Material fee, $12. (Fall and spring—day)

138 **Advanced Genetics** (3) Nash

Emphasis on genetic studies with bacteria, bacteriophage, certain fungi (biochemical genetics), and some aspects of human genetics. Original papers in the field of chromosome mechanics and cytogenetics will be considered. Prerequisite: introductory course in genetics. (Spring—day)

167 **Radiation Biology** (3) Schiff

Nature of radioactive particles and emissions; their effects on biological materials at the cellular and organismic level with emphasis on mammalian systems. Recommended but not required: two years of biological sciences and chemistry or physics. (Fall—day)

171 **Undergraduate Research** (arr.) Staff

Admission by permission of the staff member concerned. May be repeated for credit. Material fee, $15. (Fall and spring)

181–82 **Senior Seminar** (1–1) Staff

Lectures and discussions on current biological problems. (Academic year—day)

THIRD GROUP

206 **Seminar: Radiation Biology** (3) Schiff
Actions of different kinds of radiation on living material at subcellular, cellular, and organismal levels; effects of environmental alterations on radiation-induced damage; practical considerations of exposure to radioactivity. Prerequisite: B Sc 167 or equivalent. (Spring—evening)

207 **Seminar: Origin of Life** (3) Weintraub
(1972–73 and alternate years: spring—evening)

220 **Seminar: Cell Physiology** (3) Shropshire
Review in depth of selected topics. May be repeated for credit.
(1971–72 and alternate years: fall—evening)

222 **Seminar: Topics in Molecular Biology** (3)
(Formerly B Sc 219 Seminar: Topics in Cell Biochemistry)
(1971–72 and alternate years: spring—evening)

227 **Seminar: Genetics** (3) Staff

295 **Research** (arr.) (Fall and spring) Staff
Investigation of special problems. May be repeated for credit.

299–300 **Thesis Research** (3–3)
(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit.
(Fall and spring)

BOTANY

SECOND GROUP

105 **Local Flora** (3) Parker
Lecture (2 hours), laboratory and field (4 hours). Field and laboratory studies on local flora; emphasis on the woody plants. Material fee, $5.
(Fall—day)

106 **Field Botany—Lower Plants** (3) Adams
Lecture (1 hour), laboratory and field (4 hours). Primarily for non-specialists, emphasizing algae, mosses, and ferns. Material fee, $5.

109 **Structure of Seed Plants** (3) Adams
Lecture (1 hour), laboratory (4 hours). Morphology, anatomy, and histology of seed plants. Material fee, $12. (Fall—day)

110 **Lower Plants** (3) — Adams

Lecture (1 hour), laboratory (4 hours). Structure, life cycle, phylogeny, ecology, and economic importance of algae, fungi, mosses, and ferns. Material fee, $12. (Spring—day)

125 **Flowering Plants** (3) — Parker

Lecture (2 hours), laboratory and field (4 hours). Origin, development, phylogeny, and principles of classification of flowering plants. Material fee, $8. (Spring—day)

132 **Mycology** (4)

Lecture (2 hours), laboratory (3 hours). Material fee, $12.

134 **Plant Pathology** (4)

Lecture (2 hours), laboratory (3 hours). Material fee, $12.

135 **Plant Physiology** (4) — Weintraub

Lecture (2 hours), laboratory (4 hours). Physiology of seed plants with emphasis on growth, development, tropisms, and reproduction. Prerequisite: Chem 11–12. Recommended: Chem 50 or 51–52. Material fee, $15. (1972–73 and alternate years: spring—day)

141 **Plant Ecology** (4) — Sigafoos (1972–73 and alternate years: fall—evening)

Lecture (2 hours), laboratory (4 hours). Material fee, $5.

THIRD GROUP

221 **Seminar: Plant Taxonomy** (3) — Parker

(1971–72 and alternate years: fall—evening)

235 **Seminar: Plant Physiology** (3)

242 **Seminar: Plant Ecology** (3) — Sigafoos

(1971–72 and alternate years: spring—evening)

299–300 **Thesis Research** (3–3) — Staff

(Fall and spring)

ZOOLOGY

SECOND GROUP

101–2 **Invertebrate Zoology** (3–3) — Mortensen

Lecture (1 hour), laboratory (4 hours). Systematic study of invertebrate forms, including morphology, physiology, classification, life histories, and phylogenetic relationships. Material fee, $15 a semester. (Academic year—day)

104 **Comparative Vertebrate Anatomy** (4) — Atkins

Lecture (2 hours), laboratory (4 hours). Origin, early history, gross and comparative anatomy of vertebrates. Dissection of representative present-day forms. Material fee, $15. (1971–72 and alternate years: fall and spring—day; 1972–73 and alternate years: fall—day and evening)

Merchant

140 **General Ecology** (4)

Lecture (3 hours), laboratory and field (3 hours). Introduction to the concepts of limiting factors, biogeochemical cycles, trophic levels, and energy transfer, and their relationship to the structure and function of populations, species, communities, and ecosystems. Material fee, $12. (Fall—day)

Merchant

143 **Animal Ecology** (4)

Lecture (3 hours), laboratory and field (3 hours). Application of ecological principles to the understanding and manipulation of animal populations. Prerequisite: B Sc 140 or permission of instructor. Laboratory fee, $12. (Spring—day)

Staff

144 **Aquatic Ecology** (4)

Lecture (3 hours), laboratory and field (3 hours). Principles applied to aquatic systems with special references to physicochemical properties, typical habitats and communities. Prerequisite: B Sc 143 or permission of instructor. Laboratory fee, $12. (Spring—day)

Hansen

145 **Introduction to Vertebrate Embryology** (3)

Lecture (1 hour), laboratory (4 hours). Origin and early development of the individual, formation of organ systems. Emphasis on frog, chick, and pig, with reference to human embryo. Material fee, $12. (1971–72 and alternate years: fall—day and evening, spring—day; 1972–73 and alternate years: fall and spring—day)

Desmond

148 **Histology** (4)

Lecture (2 hours), laboratory (4 hours). Introduction to microscopical anatomy of normal tissues and organs with emphasis on the interrelationship of structure and function. Material fee, $12. (1971–72 and alternate years: fall—day, spring—evening; 1972–73 and alternate years: fall and spring—day)

Mortensen

152 **Protozoa** (3)

Lecture (1 hour), laboratory (4 hours). Introduction to protozoa: classification, life histories, genetics, and physiology; emphasis on free-living types. Material fee, $12. (1971–72 and alternate years: spring—evening)

Atkins

154 **Vertebrate Zoology** (4)

Lecture and discussion (2 hours), laboratory and field (4 hours). Vertebrate morphology and natural history; discussion of variation and adaptation in vertebrate forms, including systematics and the natural history of vertebrates with emphasis on higher and transitional taxa. Prerequisite: B Sc 104 or permission of instructor. Material fee, $12. (Spring—day)

Kates

155 **Parasitology** (3)

Lecture (1 hour), laboratory (4 hours). Introduction to animal parasitology; survey of parasitic types from protozoa through arthropods. Material fee, $12. (1972–73 and alternate years: fall—evening)

Desmond

157 **Comparative Endocrinology** (3)

Endocrine systems of vertebrate classes. Differences and similarities between endocrine mechanisms of fish, amphibians, reptiles, birds, and mammals, to illustrate broad trends of evolution in endocrine systems. (Spring—day)

161 **Entomology** (3) — Munson

Lecture (2 hours), laboratory (2 hours). Elementary morphology, physiology, and ecology of insects; introduction to taxonomy of more important groups. Material fee, $12. (Fall—day)

162 **Insect Physiology** (3) — Munson

Lectures and laboratory on physiology of insects. Admission by permission of instructor. Material fee, $12. (Spring—day)

163 **Human Physiology** (4) — Packer

Lecture (3 hours), laboratory (3 hours). Introduction to the function of organ systems of the human body. Prerequisite for science majors: B Sc 11–12 or equivalent. Prerequisite for physical education majors: B Sc 3–4 or equivalent. Material fee, $15. (Fall—day)

164 **Vertebrate Physiology** (4) — Packer

Lecture (3 hours), laboratory (3 hours). Survey of the chemical and physical basis of function in vertebrate organ systems. Experiments with a variety of animals illustrate classical as well as modern approaches to animal physiology. Background in biology and chemistry strongly recommended. Material fee, $15. (Spring—day)

THIRD GROUP

204 **Seminar: Invertebrate Zoology** (3) — Mortensen

Study of original publications on hormones of invertebrate animals. (Fall—evening)

*205 **Comparative Pathology** (3) — Zook

An introduction to the study of disease in vertebrates, and comparison with disease in man. Discussion of mechanisms by which various agents provoke illness, and of body defensive reactions. Illustration of common diseases of various species, including material from captive wild animals. Recommended: courses in anatomy, histology, and physiology. (Fall—evening)

245 **Histochemistry** (3) — Desmond

Theory and application of chemical techniques in determining changes in the amount and distribution of inorganic and organic constituents of tissues during different physiological and pathological conditions.

247 **Morphogenesis** (3) — Hansen

Lectures and reports on experimental morphology. Emphasis on early embryonic development. Prerequisite: B Sc 145 or equivalent. (1971–72 and alternate years: spring—evening)

250 **Seminar: Regeneration** (3) — Hansen

Discussions and reports on theories and experimental evidence in both vertebrate and invertebrate animals. (1972–73 and alternate years: spring—evening)

251 **Seminar: Vertebrate Zoology** (3) — Desmond

Study of current publications in the field of histophysiology. (1972–73 and alternate years: spring—evening)

*An interdepartmental course offered by the departments of Biological Sciences and Pathology.

265 **Comparative Animal Physiology** (3) Packer
Introduction to study of the physiological basis of adaptation of animals to environments. Attention given to animals with ability to live under unusual or extreme environmental conditions. (Fall—evening)

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

Biology

See "Biological Sciences."

Biophysics—Graduate Study

COMMITTEE ON BIOPHYSICS

C.S. Tidball *(Chairman)*, A.H. Desmond, Marvin Eisenberg, Julian Eisenstein, M.J. Jackson, Herbert Jehle

The Graduate School of Arts and Sciences offers an interdepartmental program leading to the degree of Doctor of Philosophy in the field of Biophysics. This interdepartmental program is directed by the departments of Biological Sciences, Physics, and Physiology. Entry into this program may be made through any one of these departments; however, the final program must be approved by the Committee on Biophysics. Interested students should consult either the Chairman of the Committee on Biophysics or the chairman of the department of Biological Sciences, Physics, or Physiology.

No field of undergraduate study is stipulated; however, the undergraduate program must have included the following courses, or equivalent: B Sc 11–12; Chem 22; Math 33; Phys 32, 52. In addition, candidates should present advanced undergraduate work in either chemistry, mathematics, or physics.

Doctor of Philosophy fields of study in Biophysics: Electron Microscopy, Experimental Biophysics, Instrumentation, Membrane Physics, Membrane Transport, Molecular Biology, Neurobiology, and Theoretical Biophysics.—See pages 90–94, 96–98. for requirements for the degree.

The courses to be taken prior to the General Examination will normally be selected from the following:

ANATOMY

205 *Microscopic Anatomy* (3) Telford and Staff
260 *Electron Microscopy in Cellular Biology—Lecture* (1) Blanchette-Mackie
261 *Electron Microscopy in Cellular Biology—Laboratory* (2) Blanchette-Mackie

APPLIED SCIENCE* Staff

113 *Engineering Analysis I* (3) Staff
114 *Engineering Analysis II* (3)

* See the School of Engineering and Applied Science Catalogue.

211 *Mathematical Methods in Applied Science I* (3)	Staff
212 *Mathematical Methods in Applied Science II* (3)	Staff
213 *Mathematical Methods in Applied Science III* (3)	Staff
214 *Mathematical Methods in Applied Science IV* (3)	Staff
215 *Mathematical Methods in Applied Science V* (3)	Staff

BIOCHEMISTRY

221–22 *General Biochemistry* (4–4)	Vahouny
241 *Isotopes* (3)	Burr
258 *Inherited Metabolic Diseases* (1)	Ozer

BIOLOGICAL SCIENCES

BIOLOGY

111 *Introductory Microbiology* (4)	Weintraub
115 *Cytology* (4)	Schiff
118 *Advanced Cytology* (3)	Schiff
119 *Cell Biochemistry* (4)	Weintraub
120 *Cell Physiology* (4)	Weintraub
167 *Radiation Biology* (3)	Schiff

ZOOLOGY

148 *Histology* (4)	Desmond
164 *Vertebrate Physiology* (4)	Packer
245 *Histochemistry* (3)	Desmond

CHEMISTRY

111–12 *Physical Chemistry* (3–3)	Wood
113–14 *Physicochemical Measurements* (2–2)	Wood, Schmidt
122 *Instrumental Analysis Lectures* (2)	Schmidt
213 *Chemical Thermodynamics* (3)	Wood

ELECTRICAL ENGINEERING*

60 *Introductory Electrical Engineering Laboratory I* (2)	Staff
61 *Introductory Electrical Engineering Laboratory II* (2)	Staff
153 *Design of Switching Systems* (3)	Staff
154 *Digital Computer Design* (3)	Staff
157 *Machine and Assembly Language Programming* (3)	Staff
161–62 *Electrical Engineering Laboratory* (2–2)	Staff
184 *Introduction to Medical Engineering* (3)	Eisenberg
256 *Analog and Hybrid Computers* (3)	Staff
257 *Digital Computer Programming Systems* (3)	Staff
281 *Electronic Measurements in Medicine* (3)	Staff
282 *Instrumentation in Medical Electronics* (3)	Staff
283 *Introduction to Medicine for Engineers I* (3)	Eisenberg
284 *Introduction to Medicine for Engineers II* (3)	Eisenberg

* See the School of Engineering and Applied Science Catalogue.

MATHEMATICS

111 *Mathematics for Engineers and Physicists I* (3) — Liverman and Staff
112 *Mathematics for Engineers and Physicists II* (3) — Liverman and Staff
139 *Advanced Calculus I* (3) — Liverman and Staff
140 *Advanced Calculus II* (3) — Liverman and Staff
142 *Theory of Differential Equations* (3) — Glick and Staff

MEASUREMENT SCIENCE*

131 *Measurement Laboratory* (3) — Staff

MECHANICAL ENGINEERING*

280 *Advanced Thermodynamics* (3) — Staff
295 *Statistical Thermodynamics* (3) — Staff

MICROBIOLOGY

201 *Medical Microbiology* (6) — Parlett and Staff
231 *Cellular Immunology* (2) — Staff
233 *Biology of Viruses* (4) — Robbins, Huang
257 *Experimental Immunochemistry* (3) — Wright

PHARMACOLOGY

201 *Pharmacology* (8) — Mandel and Staff
256 *Molecular Pharmacology* (2) — Hahn

PHYSICS

163 *Optics* (3) — Staff
164 *Thermodynamics* (3) — Staff
165–66 *Electromagnetic Theory* (3–3) — Staff
167 *Principles of Quantum Physics* (3) — Staff
168 *Applied Quantum Physics* (3) — Staff
170 *Elementary Solid State Physics* (3) — Jehle
172 *Biophysics* (3) — Staff
233–34 *Quantum Mechanics* (3–3) — Staff
241 *Statistical Mechanics* (3) — Staff
243 *Solid State Physics: Structure and Binding* (3) — Staff
244 *Solid State Physics: Electronic Processes in Metals* (3) — Staff
248 *Elementary Particles* (3) — Staff
249 *Statistical Processes* (3) — Staff

PHYSIOLOGY

191 *Selected Topics in Human Structure and Function* (3) — Kenney Staff
201 *Physiology* (8) — Lavine
269 *Neurophysiology and Control Mechanisms* (2) — Cassidy
270 *Electron Microscopy in Cellular Physiology* (1) — Cassidy
273 *Investigative Electron Microscopy* (3) — Cassidy

* See the School of Engineering and Applied Science Catalogue.

STATISTICS

113 *Computer Programming* (3)	Thomas and Staff
114 *Introduction to Computer Operating Systems* (3)	Thomas and Staff
115 *Programming Languages* (3)	Thomas and Staff
117 *Analysis of Variance* (3)	Staff
118 *Regression Analysis* (3)	Staff
197 *Digital Computer Programming with Applications* (3)	Thomas

Botany

See "Biological Sciences."

Business Administration

Professors J.L. Jessup, J.C. Dockeray, R.B. Eastin, H.R. Page *(Chairman)*, Frederick Amling
Professorial Lecturers L.C. Collins, R.A. Kaye, K.F. McClure, J.P. Murphy, J.F. Doubleday, W.G. Torpey
Associate Professors E.R. Magruder, P.D. Grub, Guy Black, Rodney Eldridge, E.J. Mock, R.F. Hartley, R.A. Barrett, G.P. Lauter, S.F. Divita, Siegfried Garbuny *(Visiting)*, L.C. Smith, G.F. Conner
Associate Professorial Lecturers W.G. Wells, Jr., J.F. Regan, R.W. Hagauer, J.C. Susbauer, P.L. Foster, P.M. Dickie, Bruce Benefield
Assistant Professors J.R. Roman, Jr., S.N. Sherman
Adjunct Assistant Professor Norma Loeser
Assistant Professorial Lecturers G.J. Glassman, N.R. Harbaugh, L.R. Brown, J.G. Birdsong, P.M. LoRusso, I.L. Mueller, J.R. Potter, Jr.
Lecturers C.R. Julian, W.R. Johnston, R.O. Lundquist

Programs of study in Business Administration leading to the degrees of *Bachelor of Business Administration*, *Master of Business Administration*, and *Doctor of Business Administration* are offered by the School of Government and Business Administration (see pages 127–54).

FIRST GROUP

51 Introduction to Business (3) — Page

Structure, activities, and problems of business enterprise; its contribution to the individual and to society; careers in business. (Fall—day and evening; spring—day)

SECOND GROUP

101 The Business Environment (3) — Timbers, Divita

Economic and legal environment of business enterprise; social and political influences; contemporary problems and issues. (Fall—day; spring—evening)

102 **Fundamentals of Management** (3) Conner, Mantell

Planning, organizing, directing, coordinating, and controlling activities of the administrative unit; evolution of management thinking. (Fall and spring—day and evening)

105 **Personnel Management** (3) Barrett

The labor force and labor markets. Industrial personnel and manpower programs, organizations and policy in personnel activities. (Fall—day, spring—evening)

106 **Problems in Personnel Management** (3) Loeser, Magruder

Principles and problems of personnel management and industrial relations illustrated by cases drawn from industry and government. Prerequisite: B Ad 105. (Fall—evening)

107 **Collective Bargaining** (3) Barrett, L. Smith

Characteristics of American unionism and collective bargaining; economic, social, and public policy considerations. Management's role in the negotiation and administration of collective bargaining agreements. Prerequisite: B Ad 105 or permission of instructor. (Spring—evening)

109 **Office Management** (3)

Organization and management of the office, office and information systems, planning and execution of work, systems analysis, supervision problems. Doubleday

113 **Real Estate** (3)

Principles of urban real estate practice; leasing and property management, valuation, appraisal, financing, taxation, urban growth, urban renewal. (Fall—evening) Doubleday, Wells

121 **Fundamentals of Insurance** (3)

Function of insurance in the economic life of business and individuals; risk planning, conservation, management. (Fall—evening) Doubleday

122 **Insurance Estate Planning** (3)

Estate programming, role of insurance in providing protection and estate development, disposition of the individual estate. (Spring—evening)

131 **Business Finance** (3) Mock, Amling, Foster

Techniques of the financial manager in analyzing capital requirements and methods of acquiring funds; planning efficient use of capital. Asset management, financial analysis, short-term and long-term sources of funds, capital budgeting, stockholder relationships, long-range planning. Extensive use of problems. Prerequisite: Econ 1; Acct 1–2; Math 30, 31; Stat 51. (Fall—day; spring—day and evening)

132 **International Business Finance** (3) Eldridge

Introduction to principles, practices, problems, and institutions of international finance. Emphasis on international financial markets, exchange rates, balance-of-payments restraints, and governmental policies. Prerequisite: B Ad 131. (Fall—day)

133 **Capital Formation** (3) Eldridge

Survey of the process of capital formation in a free enterprise economy. Focus on the roles of business firms, financial intermediaries, money and

capital market institutions, governmental regulatory agencies, and the fiscal and monetary policies of governments. Prerequisite: B Ad 131. (Spring—day)

135 **Managerial Finance** (3) **Mock**

Functions and objectives of financial management; problems of internal financial analysis, forecasting, planning, and control; management of corporate capital; problems of capital supply; case studies. Prerequisite: B Ad 131. (Spring—day)

138 **Investment and Portfolio Management** (3) Amling, Foster

Study of the theory and principles of security analysis and portfolio management, including analysis of the national economy, industry, company, and security markets. Risk-reward and computer-aided analysis. Prerequisite: Acct 1–2, B Ad 131. (Fall—evening; spring—day)

141 **Basic Marketing Management** (3) Divita, Hartley

Introduction to marketing and marketing management in relation to our total economy and business management, consumer and demand analysis, retailing, wholesaling, major marketing management problems and policies with emphasis on major decision areas and tools. Prerequisite: Econ 1–2. (Fall—evening; spring—day)

143 **Marketing Research** (3) **Hartley**

Principles and practices of marketing research with particular emphasis on basic methods and techniques, sources and interpretation of data, and presentation of results. Prerequisite: B Ad 141. (Fall—evening)

144 **International Marketing Management** (3) Lauter

Introductory course; analysis of the international marketing position of the United States, channels for international marketing, international advertising media, legal aspects of international marketing, methods of preparing foreign market surveys, development of policies. (Fall—evening)

145 **Sales Management** (3) **Hartley**

Organization of sales department, sales planning and forecasting, quotas, territories, performance standards, and analysis and control of distribution costs. Prerequisite: B Ad 141. (Spring—evening)

147 **Advertising** (3) **Hartley**

Advertising as a function of marketing and merchandising; uses and limitations of advertising as a tool of management; fundamentals involved in getting a finished advertisement before potential customers; evaluation, criticism, and control of advertising. (Spring—day)

158 **Physical Distribution Management** (3) Potter

Distribution from shipper's point of view: problems of plant location, inventory control, warehousing; traffic management emphasized, including private carriage. Prerequisite: Econ 1–2. (Fall—evening)

161 **Commercial Law: Contracts, Sales, Agency, Bailments** (3) Collins, McClure, Murphy

(Fall—day and evening)

162 **Commercial Law: Negotiable Instruments, Property, Mortgages** (3) Collins, McClure, Murphy
(Spring—day and evening)

163 **Law in Relation to the Form of Business Units: Corporations, Partnerships, and Trusts** (3) Murphy

171 **Principles of Transportation** (3) J. Roman
Impact of intercity transportation systems on society. Emphasis on modal differences in development, economic characteristics, and regulation. Prerequisite: Econ 1–2. (Fall—day)

172 **Public Utilities** (3) Glassman
Legal and economic meaning of public utility concept; development, services, economic characteristics, rate-making, and regulation of utility industries, with emphasis on electric, gas, and telephone industries. Prerequisite: Econ 1–2. (Spring—evening)

173 **Transportation Systems Management** (3) J. Roman
Comparative study, from the standpoint of various carrier modes, of management problems common to all modes of domestic and international transportation. Prerequisite: Econ 1–2. (Spring—day)

174 **Urban Transportation** (3) J. Roman
Problems of developing balanced transportation systems for urban areas—area needs, modal evaluation, cost effectiveness, finance, and marketing. Prerequisite: Econ 1–2 or equivalent. (Fall—evening)

175 **Introduction to Foreign Trade** (3) Kaye, Waldrip
The physical movement of goods in international business; conditions essential for successful trading; development of a hypothetical export shipment, including examples of documentation required and discussion of procedural problems from a management point of view. Emphasis on ocean marine insurance and export traffic management policy. Prerequisite: Econ 1–2. (Fall and spring—evening)

176 **International Business Theory and Policy** (3) Eldridge
Casual relationships underlying international business transactions, role of government in international trade, international agreements between private producers, trade with developing nations, developing international business policy. Prerequisite: Econ 1–2. (Spring—evening)

177 **Foreign Markets** (3) Staff
Patterns of world trade by countries and commodities, selected regional analysis, and in-depth market studies. Prerequisite: B Ad 144 or permission of instructor. (Spring—evening)

178 **Management of International Business Operations** (3) Dickie, Grub, Waldrip
Analysis of overseas projects according to purpose and type of organization; case studies involving development and management of overseas marketing programs and other operations in different world areas. Prerequisite: B Ad 175 or permission of instructor. (Spring—evening)

181 **Manufacturing Production** (3) Birdsong

Basic principles and methods of manufacturing production. Manufacturing facilities, plant and equipment. Illustrations selected from various process and fabrication industries. (Fall—evening; spring—day)

191 **Business Reports and Analyses** (3)

Sources of management information, array and analysis of data, interpretation and presentation of findings.

198 **Case Problems in Management** (3) Eastin

Principles and techniques of management illustrated by cases drawn from business and industry. Prerequisite: B Ad 102, 105, 131, 141. (Fall—day; spring—day and evening)

THIRD GROUP

201 **Social Environment of Business** (3) Divita

American business history stressing social influences. Business problems faced, decisions made, and actions taken by the historical succession of owners and managers. Business responsibility, ethics, and morality. (Fall—evening)

202 **Relations of Government to Business** (3) Timbers

(Formerly Mgt 287)

Legal foundations of the power of government to regulate and promote business, regulatory and promotional activities of the government, functions of the independent regulatory agencies, antitrust activities of government, monetary and fiscal policy, and government regulation of labor-management relations. (Spring—day)

203 **Legal Environment of Business** (3) Timbers

Business under the U.S. Constitution, federal legislation, legal precedents, and agency orders. Major emphasis on court decisions relating to business. (Spring—evening)

208 **Personnel Management and Industrial Relations** (3) Barrett, Magruder

Survey of personnel management practices and procedures, including labor-management relations. (Fall—evening)

209 **Seminar: Personnel Management** (3) Eastin

Industrial personnel and manpower management, research in advanced problems. (Spring—evening)

210 **The Personnel Manager** (3) Jessup

The personnel manager and his place in the organization, relations of personnel manager to other executives, personnel manager's policy role and relations with chief executive. Key problems of the senior personnel executive. Prerequisite: B Ad 208 or permission of instructor. (Spring—evening)

211 **Leadership and Executive Development** (3) Grub, Loeser

(Formerly Mgt 211)

Theories of managerial leadership; issues and problems associated with leadership in large organizations and at higher management levels; executive selection and development. Prerequisite: Mgt 201 or permission of instructor. (Fall and spring—evening)

212 **Unionism and Collective Bargaining** (3) L. Smith, Barrett

The American labor movement. Collective bargaining and the conduct of labor relations under collective bargaining agreements. (Fall—evening)

213 **Current Issues in Unionism, Collective Bargaining, and Labor Relations** (3) L. Smith, Barrett

Current problems and issues. Prerequisite: B Ad 212. (Spring—evening)

215 **European Common Market** (3)

Analysis of treaty establishing European Economic Community; institution of EEC and of member states and the internal law of member states as they affect doing business in EEC; series of problems arising out of establishing and operating business with and within EEC. Background in international law and antitrust law desirable. (Same as Law 541 (2)).* (Fall or spring)

217 **Seminar: International Technical and Economic Assistance** (3)

Technical and economic assistance activities of the United States, the United Nations, and specialized agencies; problems of law, policy, program, and administration; development planning; public and private transactions and institutions involving technical or economic assistance. (Same as Law 542 (2)).* (Fall or spring)

218 **Legal Aspects of International Business Transactions** (3)

U.S. law and practice, including current tax problems and U.S. restrictions on investment; brief comparison with British and civil law systems, international law, international contracts, choice of law; currency considerations; effect of SEC laws and regulations; international trade, including GATT and reciprocal trade arrangements; sources of finance, both United States and foreign, private and public, including international organizations; protection of property, settlement of disputes, and selected case studies. In addition to the regular lecturers, there will be guest lecturers in various specialties. Emphasis on current problems in international trade and investment. Prerequisite: Law 303. (Same as Law 427 (2)).* (Fall or spring)

225 **Seminar: Manufacturing Production** (3) D. Roman

Examination of production technology, including new manufacturing processes, materials, products, equipment, and facilities. Implications of emerging technology in managing the production function. Cases, individual student research. Prerequisite: B Ad 181 or permission of instructor. (Spring—evening)

231 **Financial Decision-making** (3) Mock, Amling

Functions and objectives of financial management, asset management, problems of internal financial analysis, rate-of-return analysis, financial forecasting, problems of capital demand and supply. Prerequisite: Acct 115 or equivalent, B Ad 131. (Fall—day and evening; spring—evening)

232 **Capital Resource Management** (3) Mock, Amling

Problems of capital acquisition, costs, rationing, structure; dividend policy. Prerequisite: B Ad 231. (Fall—evening)

* Students registering for B Ad 215, 217, or 218 make special arrangements with the instructor for supplementary assignments equivalent to one additional semester hour

233 **International Business Finance** (3) Eldridge

Case development and analysis of problems in international business finance. Impact of the evolving international payments system on business. Prerequisite: B Ad 131 or equivalent. (Spring—evening)

234 **Seminar: Capital Formation** (3) Eldridge

Determinants of saving and investment, timing of corporate security issues, analysis of current capital market conditions. Prerequisite: B Ad 131 or equivalent. (Fall—evening)

235 **Financial Management** (3) Mock

Problems of financial management encountered in the organization and operation of a corporation; planning financial structure, obtaining and managing capital, issuing and placing securities, administering income, security arrangements. Primarily taught by the case method. Prerequisite: Acct 215, Mgt 201. (As arranged)

237 **Investment Analysis** (3) Dockeray, Hagauer, Amling

Risk-reward analysis of security investments including analysis of national economy, industry, company, and market; introduction to portfolio management; emphasis on theory, professional application, and computer methods. Prerequisite: B Ad 131. (Fall and spring—evening)

238 **Seminar: Investment and Portfolio Management** (3) Dockeray, Hagauer, Amling

Portfolio management theory, application, and computer modeling. Independent research on investment analysis and portfolio management with emphasis on theory, cases, and computer applications. Prerequisite: B Ad 237.

241 **Advanced Marketing Management** (3) Lauter, Divita

Marketing management problems and policies in major decision areas of product planning, channels of distribution, advertising, personal selling, sales promotion, pricing, and development of integrated marketing programs. Tools useful in decision-making. Case analysis. (Fall and spring—evening)

242 **Marketing Theory** (3) Lauter, Hartley

Critical review of the development of marketing thought and important marketing literature. Special and current problems and or trends in marketing and their impact on the firm and society. Prerequisite: B Ad 241. (Fall—evening)

243 **Seminar: Marketing Research** (3) Hartley

Research as an aid to decision-making and increased efficiency in marketing, marketing research process, critical appraisal of methods and results, applications of marketing research. Cases, selected readings, and research projects. (Spring—evening)

246 **Consumer Behavior** (3) Hartley

Consumer decision-making in the market place; research in pertinent interdisciplinary studies in psychology, sociology, and other behavioral fields; present and potential applications for marketing. (Fall—evening)

248 **International Marketing** (3) Lauter

Organization for international marketing, foreign demand analysis, product development and policies, marketing structure and trade channels, ad-

vertising and promotion problems and policies, pricing, and legal aspects. Emphasis on development of effective international marketing strategy. (Spring—evening)

Lauter

249 **Seminar: Comparative Marketing** (3)

Theoretical foundation for advanced work in international business. Evaluation of domestic marketing systems of different countries with particular attention to the manner in which economic and social forces create similarities and differences in performance of the marketing function. Marketing in Western Europe, Latin America, the socialist bloc, and selected underdeveloped areas of Africa and Asia. (Spring—evening)

Potter

253 **Distribution Logistics** (3)

Application of the systems concept to problems of physical distribution and supply of goods. Role of logistics in the economy and the business firm, transportation rates and services, location theory and problems, customer service standards pricing, inventory control, information flow, scheduling, allocation, warehousing, traffic, and logistics system organization. (Spring—evening)

Grub, Eldridge

255 **International Trade** (3)

Research, analysis, and discussion of public and private foreign trade institutions; principles and theories of international trade; role of foreign trade and investment in U.S. balance of payments; problems and changing patterns in U.S. trade in the Western Hemisphere. Guest lecturers. (Fall—day and evening)

Grub, Eldridge

256 **Seminar: International Trade** (3)

Research, analysis, and discussion of international problems arising from economic integration; emphasis on European Economic Community; U.S. trade with developing nations; East-West trade problems and potential; foreign trade policy of the United States. Guest lecturers. Prerequisite: B Ad 255 or permission of instructor. (Spring—evening)

Dickie, Grub

257 **Operation of the Multinational Firm** (3)

Analysis of problems in international business by use of the case method, including international market entry and expansion; operating policies, procedures, and problems of multinational companies; developing executives for international business. Prerequisite: advanced Master's degree standing. (Spring—evening)

Grub

258 **Colloquium on International Business** (3)

Primarily for doctoral students; open to Master's candidates with permission of instructor. Research on selected problems in international business with emphasis upon national and international policies regarding regionalism, trade barriers, investment incentives, international organization, foreign aid and development assistance and its relation to trade with developing nations, and trade with the Communist Bloc. (Fall—evening)

Lauter

259 **Comparative Business Management** (3)

Primarily for doctoral students; open to Master's candidates with permission of instructor. Comparative analysis of business practices and management systems in different countries and under different economic systems. Special attention to generic characteristics of management and of business enterprises and how these are modified in different environments.

Examination of the influence of these factors on the level of economic development, social structure, history, and culture of a country. Emphasis on seminar reports and term papers. Prerequisite: Mgt 201 or equivalent. (Spring—evening)

261 **Managerial Economics I** (3) Black, Holland

Managerial applications of economic analysis. Applications of economic theory and statistics to business decisions involving demand, production, cost, profits, investments, and inventories. Prerequisite: Econ 217, Mgt 203, Stat 111 and 112; or equivalent; or permission of instructor. (Fall and spring—evening)

262 **Managerial Economics II** (3) Black, Holland

Managerial applications of economic analysis. Use of economic theory and statistics in business forecasting; interpretation of economic trends and developments; analysis of governmental economic policies as they affect business. Prerequisite: Econ 218, Mgt 203, Stat 111 and 112; or equivalent; or permission of instructor. (Fall and spring—evening)

264 **Economics of Production** (3) Black

Economics of production and manufacturing. Production functions; optimization of input mix with simple, multistage, and joint production; technological change, risk, uncertainty, progress functions. Prerequisite: Econ 101 or 217, Stat 111, college algebra or Mgt 203. (Fall—evening)

265 **Seminar: Managerial Economics** (3) Black

Primarily for doctoral students. Special topics and applications of analytical tools to business decision-making and policy, drawn principally from current literature. Preparation and presentation of seminar papers by students on approved topics. Prerequisite: B Ad 261, 262; or permission of instructor.

275 **Seminar: Transportation** (3) J. Roman

Problems and special areas of interest in transportation. Prerequisite: B Ad 171 or permission of instructor. (Spring—evening)

279 **Purchasing and Materials Management** (3) Page, Sherman

Industrial purchasing and materials management principles and practices. Organization and functions in materials management. Determination of requirements, source selection, buying practices, policies, and ethics. (Fall—day)

280 **Procurement and Contracting** (3) Sherman, Benefield

Overview of procurement and contracting; emphasis on federal government buying policies, practices, and procedures. (Fall—evening)

282 **Government Contract Administration** (3) Sherman

Surveillance over performance of contract. Rights and obligations; changes, suspension of work, default, termination for the convenience of the government, inspection, warranties, procedures for the settlement of controversies on government contracts.

283 **Pricing and Negotiation** (3) Sherman

Scope and objectives of negotiated procurement; participation and relationships of functional elements of the organization; preparation, conduct, and recording of negotiations; analysis of contract cost, price, profit, investment, and risk; cost principles; incentives; relationship of contract

type to work requirements; techniques of negotiation. Prerequisite: B Ad 280 or permission of instructor. (Fall)

284 **Procurement Data Management** (3) Sherman

Technical data and the procurement process; organizational and functional relationships, contract-controlling documentation, patent rights, rights in data, requirements determination and the acquisition of data, federal policies, contractor interests. Configuration management; control of changes.

285 **Systems Procurement and Project Management** (3) D. Roman, Divita

Development and procurement of major systems. Project management and the impact of this technique on the procurement process. Procurement planning—from concept formulation through contract definition, development, and manufacture.

286 **Government Contracts** (2)

Survey of basic law underlying government procurement, basic power and limitations on federal government in entering into contracts, administrative and legislative policies governing these contracts, advertised and negotiated procurement procedures, forms of contracts and clauses used. (Same as Law 355). (Fall or spring)

287 **Government Procurement Law** (2)

Survey of the law pertaining to government procurement, including an analysis of the unique features of government contracting and a discussion of the functions of Congress, the executive branch, and the courts in the procurement process. (Same as Law 431). (Fall or spring)

288 **Formation of Government Contracts** (2)

Detailed coverage of the rules and practices followed in arriving at contracts between the government and private parties. Comparison in depth of advertised and negotiated procurement and analysis of the techniques used in pricing and arriving at the terms of such contracts. (Same as Law 432). (Fall or spring)

289 **Performance of Government Contracts** (2)

Discussion of the substantive legal problems that most frequently arise during the performance of government contracts. Interpretation of specifications and the most generally used contract clauses, and analysis of the rights of the parties when performance in accordance with the terms of the contract is not obtained. (Same as Law 433). (Fall or spring)

290 **Government Contract Claims and Litigation** (2)

Analysis of the methods which can be used by the parties to a government contract to obtain legal relief, including detailed coverage of the disputes procedure, actions for breach of contract, and forms of equitable and extraordinary relief. (Same as Law 434). (Fall or spring)

Eastin

291 **Seminar: Business Management** (3)

Primarily for doctoral students. Research on various phases of management as practiced in American industry. (Fall and spring—evening)

293 **Business Research** (3)

May be repeated once for credit. (Fall or spring)

295 **Business Decision Simulation** (3) Dickie

Managerial decision-making in a diversified multinational firm. Students are organized into teams in a simulated competitive environment in which a complex situation is played out using computers. Prerequisite: advanced Master's or doctoral degree standing.

297 **Case Studies in Business Administration** (3) Jessup, Page

Cases covering the whole range of business activity. Analysis of operational situations and policy issues. Developing and implementing solutions to managerial problems. Prerequisite: advanced Master's degree standing. (Fall and spring—day and evening)

298 **Readings in Business** (3) Conner, Kaye

Supervised readings in selected fields within business administration. Admission by permission of instructor. May be repeated once for credit. (Fall and spring—evening)

299 **Thesis Seminar** (3) Hartley

Examination of thesis standards, research philosophy and methodology. (Fall and spring—evening)

300 **Thesis Research** (3) Staff

(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Business Administration general examination. May be repeated for credit. (Fall and spring)

399 **Dissertion Research** (arr.) Staff

Limited to Doctor of Business Administration candidates. May be repeated for credit. (Fall and spring)

Chemistry

Professors S.N. Wrenn *(Emeritus)*, C.R. Naeser *(Chairman)*, R.C. Vincent, R.E. Wood, T.P. Perros, W.E. Schmidt, D.G. White, J.B. Levy, Nicolae Filipescu
Associate Professors Bette Barton, F.L. Minn, A.D. Britt, E.A. Caress
Associate Professorial Lecturer Abraham Schwebel
Assistant Professor D.A. Rowley
Adjunct Assistant Professors James Cadigan, William Oberg, P.G. Tunstall, E.H. Williams
Assistant Professorial Lecturer Donald Jerina
Lecturers F.C. Edmundson, C.R. Midkiff, Jr., S.W. Fleisher, Anna Thomas

Bachelor of Arts or *Bachelor of Science with a major in Chemistry (Departmental).*—The Department offers two undergraduate majors designed to give students broad training in the basic divisions of chemistry: analytical, inorganic, organic, and physical chemistry. *Major I* provides considerable concentration in chemistry. However, it permits a wider selection of electives and thus should meet the needs of students preparing to enter medicine, dentistry, or related fields. *Major II* is intended primarily for students preparing for graduate study in chemistry or those planning

to enter the chemical profession and wishing to be certified to the American Chemical Society as having met the minimum requirements for professional training. Two foreign languages are recommended for students planning to do graduate work in chemistry.

Prerequisite: the Arts and Letters or the Science curriculum, respectively, pages 76–77, including Chem 11–12 and 22 or 15–16, 51–52, 53–54; Math 31; Phys 1, 2.

Major I—required: the general requirements, pages 81–85, including Chem 111–12, 113–14, 122, 134, and 141.

Major II—required: the general requirements, pages 81–85, including the German language, all requirements of Major I (except Chem 134) plus Chem 142, 235; Math 32; one course selected from Chem 195, 207, 213, 221, 222, 234, 251, Math 111, 139, Phys 161, 165, 175, Stat 197. The student is encouraged to take Math 33 and Phys 31–32 in preparation for advanced courses and graduate work. These courses are essential to graduate work in theoretical chemistry.

Master of Science in the field of Chemistry.—Prerequisite: a Bachelor's degree with a major in Chemistry from this University, or an equivalent degree.

Required: the general requirements, pages 90–96. The required 30 semester hours of graduate work must include Chem 213 and 221, and at least two of the following: Chem 207, 236, and 251. In addition to the above, Chem 193, 299–300, and at least 4 semester hours of advanced laboratory work are also required. Courses which may be taken to satisfy this laboratory requirement are Chem 221 and 222 (3 semester hours), 136, 155, and 156; a maximum of 2 semester hours of Chem 295 may also be applied to the laboratory requirement. The thesis requirement, Chem 299–300, may be in analytical, inorganic, organic, or physical chemistry. Chem 156 is prerequisite to Master's thesis work in the field of organic chemistry. All graduate students are required to participate in the seminar program (Chem 291) and colloquium program. A reading knowledge examination in French, German, or Russian (German or Russian preferred) must be passed before the second half of the work is started. A student who intends to become a doctoral candidate is strongly urged to take Chem 207 as early as possible in his graduate program.

Master of Science in the field of Geochemistry (an interdepartmental degree offered by the departments of Chemistry and Geology).—Prerequisite: a Bachelor's degree with a major in Chemistry or in Geology from this University, or an equivalent degree.

Required: the general requirements, pages 90–96, including Chem 111, 112; Geol 141, 241, 249; and Chem 213 or Geol 245. The Master's Comprehensive Examination must be taken before registration for the second half of the thesis work. A reading knowledge examination in a foreign language, approved by the Department of Chemistry or Geology, must be passed before the second half of the work is started.

Doctor of Philosophy in the field of Chemistry.—Required: the general requirements, pages 90–94, 96–98. Course requirements depend on the student's background. The tool requirement options are (1) a foreign language reading examination in German and either French or Russian or (2) a foreign language reading examination in German and a demonstrated proficiency in computer programming. The latter option is required for students in physical or theoretical chemistry. Cumulative examinations replace the "General Examination" requirement.

Research fields: Analytical Chemistry, Chemistry of Natural Products, Inorganic Chemistry, Organic Chemistry, Physical Chemistry (Electrochemistry, Kinetics, Magnetic Resonance, Theoretical), and Physical Organic Chemistry (Reaction Mechanisms).

Doctor of Philosophy field of study in Geochemistry (an interdepartmental field offered by the departments of Chemistry and Geology).—Required: the general requirements, pages 90–94, 96–98, including a reading knowledge examination in an approved foreign language plus the satisfactory completion of Stat 117 and 118, or 49; and the satisfactory completion of the General Examination in four fields, including chemistry and geochemistry.

Bachelor of Arts in Education with a teaching field in Chemistry.—Prerequisite: ...e Education curriculum, pages 78–79.
Required: the Chemistry option and professional courses on pages 107, 115.

Graduate Placement Examinations: All entering students in the Master's and ...octoral programs in the field of Chemistry are required to take the American ...hemical Society Graduate Level Placement Examinations, given by the Department ...f Chemistry, prior to registration in the Graduate School of Arts and Sciences. The ...our placement examinations (in the disciplines of analytical, organic, inorganic, and ...hysical chemistry) are of the multiple-choice type. These tests are designed to ...ver the subject matter in the disciplines generally taught in modern undergraduate ...rograms preparatory for graduate work in chemistry, and the results are used by ...he Department to advise the individual student in planning a program of courses ...hich are appropriate to his background.

Registration: Before completing registration each student must obtain from the ...epresentative of the Department an assignment to lecture, recitation, and laboratory ...ections. The work of the junior and senior years must be approved by the Depart...ent.

PHYSICAL SCIENCE

FIRST GROUP

3–4 **Fundamentals of Physical Science for Nonscience Majors (3–3)** — Barton, Filipescu, Minn

A year course: credit toward a degree at this University given on completion of Chem 4. Lecture (2 hours), laboratory (3 hours). Selected topics from chemistry, physics, astronomy, and geology are integrated to introduce the nonscience major to the basic methods and achievements of physical science. Laboratory fee, $11 a semester. (Academic year—day)

CHEMISTRY

FIRST GROUP

11–12 **General Chemistry (4–4)** — Staff

A year course: credit toward a degree at this University given on completion of Chem 12. Lecture (3 hours), laboratory (3 hours), recitation (1 hour). Elementary course in general chemistry, including qualitative analysis. Prerequisite: one year of high school algebra. Laboratory fee, $18 a semester. (Offered every year: academic year—day; 1972–73 and alternate years: academic year—evening)

13 **General Chemistry (4)** — Rowley

For School of Engineering and Applied Science students only. Lecture (3 hours), laboratory (3 hours), recitation (1 hour). Atomic structure, chemical bonding; chemical equations; oxygen, hydrogen, acids, and bases; chemical equilibrium; liquid and solid states; periodicity; electrochemistry; organic chemistry. Prerequisite: Phys 2, Math 31. Laboratory fee, $18. (Fall—day)

15–16 **Intensive General and Analytical Chemistry** (Honors Course) (4–4) Minn

Chem 15: lecture (3 hours), laboratory (3 hours), recitation (1 hour). Chem 16: lecture (2 hours), laboratory (6 hours), recitation (1 hour). Equivalent to Chem 11–12 and 22, but with selected topics studied in depth. Prerequisite to Chem 15: high school physics and chemistry. Prerequisite to Chem 16: Chem 15. Admission by placement test prior to registration or on basis of College Board Advanced Placement Examination. Laboratory fee, $13 a semester. (Academic year—day)

22 **Introductory Quantitative Analysis** (4) Vincent

Lecture (2 hours), laboratory (6 hours). Theory and practice of quantitative analysis by classical volumetric and gravimetric methods and introduction to instrumental analysis. Prerequisite: Chem 12. Laboratory fee, $18. (Offered every year: fall and spring—day; 1971–72 and alternate years: spring—evening)

50 **Introduction to Organic Chemistry** (4) Caress

Lecture (3 hours), laboratory (3 hours). A terminal course for students in related disciplines. This course does not fulfill the organic chemistry requirement for chemistry majors or premedical students. Prerequisite: Chem 12 or 16. Laboratory fee, $12. (Fall—day)

51–52 **Organic Chemistry** (3–3) Levy, Caress

A year course: credit toward a degree at this University given on completion of Chem 52. Chemistry of the compounds of carbon. Prerequisite: Chem 12 or 16. (Academic year—day and evening)

53–54 **Organic Chemistry Laboratory** (1–1) Staff

Laboratory complement of Chem 51-52. Prerequisite or concurrent registration: Chem 51–52. Prerequisite to Chem 54: Chem 53. Laboratory fee, $12 a semester. (Academic year—day and evening)

SECOND GROUP

110 **Introduction to Physical Chemistry** (3) Wood

Topics include chemical thermodynamics, chemical kinetics, electrochemistry, solution chemistry, membrane and phase equilibria, and others. Prerequisite: Chem 16 or 22, Math 31, Phys 2; or permission of instructor. Not open to chemistry majors. May not be taken for credit by students who have received credit for Chem 111–12 or an equivalent course.

111–12 **Physical Chemistry** (3–3) Wood

Gas laws, chemical thermodynamics, solution chemistry, chemical equilibrium, kinetics, chemical statistics, electrochemistry, and other topics. Prerequisite to Chem 111: Chem 16 or 22; Math 31; Phys 2. Prerequisite to Chem 112: Chem 111. (Offered every year: academic year—day; 1972–73 and alternate years: academic year—evening)

113–14 **Physicochemical Measurements** (2–2) Wood, Schmidt

Laboratory complement to Chem 111–12 and 122. Prerequisite or concurrent registration for Chem 113: Chem 111. Prerequisite or concurrent registration for Chem 114: Chem 112, 113, and 122. Laboratory fee, $18 a semester. (Academic year—day)

122 **Instrumental Analysis Lectures** (2) Schmidt

Theory of instrumental methods in qualitative and quantitative analysis, determination of structure, and study of reaction mechanisms with emphasis on electroanalysis, spectrophotometry, and chromatography. Correlated with Chem 114. Prerequisite or concurrent registration: Chem 112. (Offered every year: spring—day; 1971–72 and alternate years: spring—evening)

134 **Descriptive Inorganic Chemistry** (2) Rowley

Intermediate-level course emphasizing the descriptive chemistry of the elements. Prerequisite: Chem 16 or 22, 52. Prerequisite or concurrent registration: Chem 111. (Fall—day)

136 **Inorganic Chemistry: Preparations** (2) Perros

Application of the technique of inorganic chemistry to the preparation and purification of a list of selected substances. Prerequisite: Chem 52 and 141. Prerequisite or concurrent registration: Chem 134 or 235. Laboratory fee, $18. (Spring—day)

141–42 **Advanced Experimental Chemistry** (2–2) Perros, Caress

Designed to provide the chemistry major with facility in experimental methods common to all disciplines of chemistry. Prerequisite: Chem 54. Prerequisite or concurrent registration: Chem 111. Laboratory fee, $12 a semester. (Academic year—day)

155 **Organic Chemistry: Preparations** (2 or 3)

Synthesis of organic compounds and application of the technique of organic chemistry to the preparation of pure compounds, using larger amounts and greater refinements than in Chem 53–54. Prerequisite: Chem 16 or 22, 54. Laboratory fee, $10.50 a semester hour. (Spring—evening)

156 **Qualitative Organic Analysis** (3)

Lecture (1 hour), laboratory (6 hours). Identification of pure organic compounds, separation of mixtures, and identification of their components. Required of all students planning thesis work in organic chemistry. Prerequisite: Chem 16 or 22, 54. Laboratory fee, $18. (Spring—evening)

191 **History of Chemistry** (2) Perros

Historical development of chemistry. Prerequisite: Chem 52. (1971–72 and alternate years: fall—evening)

193 **Chemical Literature** (1) Wrenn

A general course; reference work and reports. Prerequisite: Chem 16 or 22, 52. Prerequisite or concurrent registration: Chem 111. (Fall—evening)

195 **Undergraduate Research** (1 or 2) Staff

Research on problems approved by the Staff. May be repeated once for credit. Laboratory fee, $7.50 a semester hour. (Fall and spring)

THIRD GROUP

203 **Chemical Kinetics** (2) Levy

Rates of chemical reactions and factors influencing them. Prerequisite: Chem 52, 112. (1971–72 and alternate years: spring—evening)

207 **Chemical Bonding** (3) Barton

Application of wave mechanics to current chemical problems. Molecular orbital theory, atomic and molecular structure, spectroscopy, chemical application of group theory. Prerequisite: Chem 112. (Fall—day)

211–12 **Physical Chemistry** (2–1) Wood

Same as Chem 111–12. Admission only by departmental permission. Credit assigned upon satisfactory completion of Chem 213. (Offered every year: academic year—day; 1971–72 and alternate years: academic year—evening)

213 **Chemical Thermodynamics** (3) Wood

Application of thermodynamics to chemical problems. Thermochemistry, homogeneous and heterogeneous equilibria, statistical calculation of thermodynamic properties, electrochemistry. Prerequisite: Chem 112 or 212. (Fall—evening)

214 **Principles of Magnetic Resonance** (3) Barton

Application of magnetic resonance to chemical problems, emphasis on the close connection between theory and experiment. Molecular motions, relaxation theory, bonding, etc. Prerequisite: Chem 207 or permission of instructor. (1972–73 and alternate years: spring—day)

215 **Quantum Chemistry** (3) Minn

Postulates of quantum mechanics, exactly solvable systems, variation and perturbation approximations, atomic and molecular structure and spectra, the chemical bond. Prerequisite: Chem 207 or permission of instructor. (1971–72 and alternate years: fall—evening)

216 **Statistical Mechanics as Applied to Chemistry** (3) Barton

Introduction to classical and quantum statistics designed to acquaint the student with basic principles and application of method. Prerequisite or concurrent registration: Chem 207 or permission of instructor. (1971–72 and alternate years; spring—evening)

219 **Spectrochemistry** (3) Filipescu

Energetic states of molecules under the influence of electromagnetic radiation and their relation to structures and spectroscopic properties. Prerequisite: Chem 207 and 221, or permission of instructor. (1971–72 and alternate years: spring—evening)

221 **Advanced Analytical Chemistry I** (3) Britt

Lecture (2 hours), laboratory (3 hours). Theory and application of recent spectrometric methods of analysis, including electrical, magnetic, and optical instrumentation. Prerequisite: Chem 122. (Spring—evening)

222 **Advanced Analytical Chemistry II** (2 or 3) Schmidt

Lecture (2 hours), laboratory (3 hours—optional). Theory and application of electroanalysis and separations by physicochemical methods. Prerequisite: Chem 122. Laboratory fee, $7.50. (1971–72 and alternate years: fall—evening)

231 **Coordination Chemistry** (2) Perros

Selected topics including application of ligand field theory and molecular orbital theory to transition metal complexes, determination of stability constants, and methods for the synthesis of representative coordination

compounds. Prerequisite: Chem 237. (1972–73 and alternate years: fall—evening)

232 **The Lanthanide and Actinide Elements** (2) Perros

Comprehensive review of the physical and chemical properties of the lanthanide and actinide elements; particular emphasis on the more recent developments. Prerequisite: Chem 236. (1972–73 and alternate years: spring—evening)

233 **Organometallic Chemistry** (3) White

Survey of organometallic compounds with emphasis on the compounds of lithium, boron, aluminum, silicon, the transition metals, and the catalytic role of certain organotransition metal complexes. Prerequisite: Chem 236 and 251, or permission of instructor. (1972–73 and alternate years: fall—evening)

234 **Nuclear and Radiochemistry** (2) Schwebel

Preparation, properties, and uses of radioactive atoms, both natural and synthetic. Prerequisite: Chem 235. (1972–73 and alternate years: fall)

235–36 **Advanced Inorganic Chemistry** (3–3) White

Application of modern chemical theories to inorganic substances and reactions followed by a detailed study, developed from the periodic table, of the chemistry of the more common elements. Prerequisite to Chem 235: Chem 52, 112. Prerequisite to Chem 236: Chem 235. (Academic year—evening)

237 **Physical Inorganic Chemistry** (2) Rowley

Quantitative application of modern theories for interpretation and explanation of the electronic properties of transition-metal complexes. Prerequisite: Chem 112 and 134, or Chem 235. (1971–72 and alternate years: spring—evening)

251–52 **Advanced Organic Chemistry** (3–3) Filipescu

Synthesis, reactions, and properties of organic compounds; fundamental theories of organic chemistry, emphasis on reaction mechanisms. Prerequisite to Chem 251: Chem 52, 112. Prerequisite to Chem 252: Chem 251. (Academic year—evening)

253 **Advanced Synthetic Organic Chemistry** (3) Wrenn

Study of reactions employed in the synthesis of organic compounds. Prerequisite: Chem 251. (Spring—evening)

257 **Physical Organic Chemistry** (2) Levy

Physical aspects of the reactions of organic compounds; effects of structure and medium on reactivity. Prerequisite: Chem 252 or permission of instructor. (1972–73 and alternate years: spring—evening)

258 **Natural Products** (2) Caress

Methods of structure determination and synthesis of naturally occurring compounds; some aspects of the chemistry of terpenes, steroids, alkaloids, etc. Prerequisite: Chem 251 or permission of instructor. (1972–73 and alternate years: spring—evening)

259 **Polymer Chemistry** (3)
Preparation, properties, and structure of macromolecules. Prerequisite: Chem 52, 112. (1971–72 and alternate years: fall—evening)

291 **Seminar: Recent Developments in Chemistry** (0) Staff
All graduate students are required to participate in this seminar throughout their period of residence in the Department. No academic credit. No tuition fee required. (Fall and spring—day)

295 **Research** (arr.) Staff
Research on problems approved by the Staff. Open to qualified students with advanced training. May be repeated for credit not to exceed a total of 8 semester hours. Laboratory fee, $7.50 a semester hour. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff
Laboratory fee, $18 a semester. (Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy cumulative examinations. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Chinese

See "East Asian Languages and Literatures."

Classics

Professor J.F. Latimer
Associate Professorial Lecturer A.B. Seidman
Assistant Professor J.E. Ziolkowski *(Chairman)*
Adjunct Assistant Professor Mary Norton
Assistant Professorial Lecturers Mary Nutting, D.B. Beers, Neil Levine, Zvi Porath

Bachelor of Arts with a major in Classical Humanities (Departmental).—Prerequisite: the Arts and Letters curriculum, page 76, including Clas 3–4 (or equivalent) or Clas 13–14; Clas 71, 72; Hist 39–40.

Required: the general requirements, pages 81–85, including Clas 105, 108, 113, 127, 137–38; Art 102 or 111; Hist 105, 109, 110; Phil 111. A reading knowledge of French and German is recommended.

Bachelor of Arts with a major in Latin (Departmental).—Prerequisite: the Arts and Letters curriculum, page 76, including Hist 39–40.

Required: the general requirements, pages 81–85, and (1) 22 semester hours in Latin beyond first-group courses, including Clas 131–32, 137–38; (2) Art 111, Hist 109 or 110, Phil 111. A reading knowledge of French and German is recommended.

Bachelor of Arts with a major in Classical Archeology and Greek (Departmental).—This interdepartmental major may be arranged in conjunction with the Department of Art. Prerequisite: the Arts and Letters curriculum, page 76, including Clas 13–14, Hist 39–40.

Required: the general requirements, pages 81–85, including 12 semester hours of second-group courses in Greek; Clas 137–38; Art 101, 102, 103, 111; Hist 109, 110; Phil 111. A reading knowledge of French and German is recommended.

Clas 1–2 and 3–4 or 11–12 and 13–14 or 21–22 and 23–24 satisfy the foreign language requirements. Clas 71, 72 satisfies the literature requirement in Columbian College. For students entering with two years of high school Latin, Clas 3–4 will satisfy the language requirement.

LATIN AND GREEK

FIRST GROUP

1–2 **First-year Latin** (3–3) — Nutting and Staff

A year course: credit toward a degree at this University given on completion of Clas 2. Functional presentation of the essentials of the language, appropriate reading selections, development of English derivatives, introduction to Roman life and literature. (Academic year—day)

3–4 **Second-year Latin** (3–3) — Norton

A year course: credit toward a degree at this University given on completion of Clas 4. Continuation of Clas 1–2; emphasis on Latin readings that illustrate Roman life and literature. Prerequisite: Clas 1–2 or two years of high school Latin. (Academic year—day)

11–12 **First-year Greek** (3–3) — Ziolkowski

A year course: credit toward a degree at this University given on completion of Clas 12. Essentials of grammar; appropriate reading selections. Text used varies between Attic and Homeric Greek. (Academic year—day)

13–14 **Second-year Greek** (3–3) — Ziolkowski

A year course: credit toward a degree at this University given on completion of Clas 14. Review of grammar; rapid reading from selected Greek authors. Prerequisite: Clas 12. (Academic year—day)

SECOND GROUP

101–2 **Introduction to Latin Literature** (3–3) — Beers

Selections from a wide variety of Latin authors of prose and poetry. Prerequisite: Clas 3–4 or equivalent. (Clas 101: fall—day)

103 **Roman Comedy** (3) — Norton

Selected plays from Plautus and Terence. Prerequisite: Clas 101–2 or permission of instructor.

109–10 **Latin Prose and Poetry of the Golden Age** (3–3) — Norton

Selections from one or two major authors will be read each semester. May be repeated for credit. Prerequisite: Clas 101–2 or permission of instructor. (Clas 109: fall—day)

117–18 **Latin Prose and Poetry of the Silver Age** (3–3) Staff

Selections from one or two major authors will be read each semester. May be repeated for credit. (Clas 117: spring—day)

131–32 **Latin Prose Composition** (1–1) Norton

Exercises in Latin prose composition for Latin majors. Other students may enroll by permission of instructor.

133–34 **Medieval Latin Literature and Texts** (3–3) Andrews

Wide variety of selections in prose and poetry for rapid reading. Prerequisite: Clas 101–2 or permission of instructor. May be taken for graduate credit with permission of instructor. (Academic year—day)

135–36 **Survey of Latin Literature** (3–3) Staff

Latin literature in historical sequence. For Latin majors. Other students may enroll by permission of instructor.

137–38 **Introduction to Classical Studies** (1–1) Latimer

Required course for Latin or Classical Archeology and Greek majors; other students admitted with permission of instructor. Survey of the broad range of sources and resources involved in pursuing classical studies: standard references, periodicals, library holdings, papyrology, textual criticism, history of classical scholarship.

139 **Readings in Greek Literature** (1 or 2) Ziolkowski

Selections from a wide variety of Greek prose, drama, and poetry, suited to the needs of the class. May be repeated for credit with permission of instructor. Prerequisite: Clas 14.

141 **Medieval Latin** (3)

Selections from the Vulgate and representative Latin writers through the 11th century. Prerequisite: Clas 101–2 or permission of instructor. May be taken for graduate credit with approval of instructor.

COURSES IN ENGLISH TRANSLATION

FIRST GROUP

71 **Greek and Roman Epic, History, and Biography** (3) Ziolkowski

Selections from Homer, Herodotus, Thucydides, Plutarch, Livy, Tacitus, Suetonius, Vergil, and Ovid. Students who receive credit for Clas 105 cannot receive credit for Clas 71. (Spring—day)

72 **Greek and Roman Poetry, Drama, Philosophy, and Satire** (3) Ziolkowski

Selections from Pindar, Sophocles, Euripides, Aristophanes, Plautus, Terence, Plato, Epicurus, Aristotle, Zeno, Seneca, Apuleius, and Juvenal. Students who receive credit for Clas 105 cannot receive credit for Clas 72. (Fall—day; spring—evening)

SECOND GROUP

105 **Survey of Classical Humanities** (3) Norton

Representative masterpieces of Greek and Roman literature: epic, lyric, dramatic, philosophical, and historical. Students who receive credit for Clas 71 or 72 cannot receive credit for Clas 105.

108 **Classical Mythology** (3) Norton

Mythology of the Greeks and Romans from the creation of the world: tales of the gods, heroes, and great families that have influenced literature, art, and music. Prerequisite: Engl 1, 40; or equivalent. (Spring—day)

113 **Greek and Roman Drama** (3) Norton

Selected masterpieces of Greek and Roman tragedy and comedy. (Fall—day)

127 **Legacy of Greece and Rome** (3) Ziolkowski

(Replaces former Clas 125 The Legacy of Greece (3) and Clas 126 The Legacy of Rome (3))

Study of our classical heritage, with emphasis on literature and art, political institutions, and law and their influence in the Western world. Prerequisite: Clas 71, 72; or Clas 105; or Hist 39; or permission of instructor. (Spring—day)

171 **Seminar: Classics and Goals for America** (3) Latimer

An extensive and intensive search for ways of applying ancient thought to modern problems. Selected current readings; extensive reading of Greek and Latin authors. Primarily for juniors and seniors. Prerequisite: Clas 71 and 72, or 105; or permission of instructor. (Fall and spring—day)

HEBREW

FIRST GROUP

21–22 **First-year Hebrew** (3–3) Seidman

A year course: credit toward a degree at this University given on completion of Clas 22. Study of the elements of Hebrew; emphasis on sources of the language, reading comprehension, writing facility, and conversation. (Academic year—day and evening)

23–24 **Second-year Hebrew** (3–3) Seidman

A year course: credit toward a degree at this University given on completion of Clas 24. Review of grammar; continued development of reading comprehension, writing facility, and conversation. Selections from Hebrew text of the Old Testament and other materials. (Academic year—day and evening)

East Asian Languages and Literatures

Professor Chung-wen Shih *(Acting Chairman)*
Associate Professorial Lecturers Jane Evans, Thomas Lawton
Assistant Professors G.C.Y. Wang, D.L. Lee
Assistant Professorial Lecturer Ming-jean Loh

Bachelor of Arts in the field of Chinese Studies.—See Public and International Affairs, pages 383–84.

CHINESE

FIRST GROUP

1–2 **Beginning Mandarin Chinese, Level I** (3–3) Staff

A year course: credit toward a degree at this University given on completion of Asia 2. Classroom (3 hours), laboratory (1 hour). Fundamentals of grammar and pronunciation with graded reading and practice in writing. Listening comprehension and oral practice in language laboratory. Laboratory fee, $17.50 a semester. (Academic year—evening)

3–4 **Beginning Mandarin Chinese, Level II** (3–3) Wang

A year course: credit toward a degree at this University given on completion of Asia 4. Classroom (3 hours), laboratory (1 hour). Continuation of grammar and spoken Chinese with more emphasis on the written language and reading. Aural training, oral practice in language laboratory. Prerequisite: Asia 2 or equivalent. Laboratory fee, $17.50 a semester. (Academic year—evening)

5–6 **Beginning Intensive Mandarin Chinese, Levels I–II** (6–6) Lee

Classroom (6 hours), tutorial (2 hours), laboratory (1 hour). Intensive beginners' course in fundamentals of grammar and pronunciation with graded reading and practice in writing. Listening comprehension and oral practice in language laboratory. Prerequisite to Asia 6: Asia 5 or 2. Laboratory fee, $17.50 a semester. (Academic year—day)

7–8 **Intermediate Intensive Mandarin Chinese** (6–6) Wang

Classroom (6 hours), tutorial (2 hours), laboratory (1 hour). Reading basic texts; writing short pieces; conversation; systematic review of grammar. Prerequisite to Asia 7: Asia 4 or 6. Prerequisite to Asia 8: Asia 7. Laboratory fee, $17.50 a semester. (Academic year—day)

SECOND GROUP

103 **Intensive Readings in Modern Chinese** (6) Staff

Intensive readings in selected modern literary works, social sciences, and documentary materials. Prerequisite: Asia 8 or equivalent. (Fall—day)

105 **Introduction to Classical Chinese (Intensive)** (6) Staff

Introduction to classical writing in Chinese literature, history, and philosophy. Prerequisite: Asia 4 or 6. (Spring—day)

123–24 **Introduction to Chinese Linguistics** (3–3) Staff

Designed for students in the Chinese language and for students in linguistics or comparative philology. Introduction to the history of the Chinese language. Analysis of linguistics structure of modern spoken Chinese and classical Chinese. Prerequisite: Asia 4 or 6, or a course in linguistics.

161 **Aspects of Chinese Culture** (3) Lawton

Lecture and discussion relating to the emergence and stylistic development of neolithic painted pottery, Shang and Chou dynasty bronze ritual vessels, and Buddhist sculpture and painting. Emphasis on problems in Chinese figure and landscape painting from the Han through the Ch'ing dynasties. (Fall—evening)

165 **Chinese Literature in Translation** (3) Shih

Open to students who have no knowledge of the Chinese language. General survey of the development of Chinese literature from ancient times to present. Major works will be studied in terms of their historical development. (Fall—day)

167 **Chinese Fiction in Translation** (3) Shih

Open to students who have no knowledge of the Chinese language. Reading of major novels, including *Romance of the Three Kingdoms, All Men Are Brothers, Golden Lotus, Dream of the Red Chamber, Scholars,* and *The Travels of Lao Ts'an.* (Spring—day)

171–72 **Poetry of the T'ang and Sung Periods** (3–3) Staff

Reading of works of leading poets. Discussion of content and style. Prerequisite: Asia 103 or equivalent.

173 **Yüan Drama** (3) Shih

Reading of plays by Kuan Han-ch'ing, Ma Chih-Yüan, Cheng Kuang-chu, Po P'u, and Wang Shih-fu. Prerequisite: Asia 103 or equivalent. (Fall—day)

177–78 **Prose Narratives of the Sung, Ming, and Ch'ing Periods** (3–3) Staff

Short stories of the Sung period. Selected readings of Ming-Ch'ing novels. Historical development and stylish traits. Prerequisite: Asia 103 or equivalent.

179–80 **20th Century Chinese Literature** (3–3) Staff

Short stories of Lu Hsün, Lao She, Shen Tsung-wen, Mao Tun, and others. Informal essays by Lu Hsün, Chou Tso-jen, and Chu Tzu-ch'ing. Poetry of Wen I-to and Kuo mo-jo. Drama of T'ein Han and Ts'ao Yü. Prerequisite: Asia 103 or equivalent.

185–86 **Direct Reading** (3–3) Staff

Reading of material pertaining to individual research. Admission by permission of instructor. (Academic year—day)

188 **Writing Seminar** (3) Staff

Lectures and discussions on bibliography and research methods. Guided research with a paper on a specific topic in Chinese literature. Prerequisite: 9 semester hours of second-group courses in Chinese.

EAST ASIAN LITERATURE IN TRANSLATION

FIRST GROUP

91–92 **Introduction to Asian Literature** (3–3) Evans, Shih

Survey of Chinese, Japanese, and Indian literature, in translation, from earliest periods through literary masterpieces of the early 20th century. Lecture and discussion—in English. Term paper required.

JAPANESE

FIRST GROUP

Staff

21–22 **Beginning Intensive Japanese** (6–6)

Classroom (6 hours), tutorial (2 hours), laboratory (1 hour). Intensive beginners' course in fundamentals of grammar and pronunciation with graded reading and practice in writing. Listening comprehension and oral practice in language laboratory. Prerequisite to Asia 22: Asia 21. Laboratory fee, $17.50 a semester. (Academic year—day)

Economics

Professors A.E. Burns, D.S. Watson, J.W. Kendrick, C.T. Stewart, Jr., C.E. Galbreath, Joseph Aschheim, R.P. Sharkey, J.L. Knetsch, Henry Solomon *(Chairman)*, G.L. Mangum *(Research)*, Sar Levitan, Louis De Alessi, Robert Davis *(Visiting)*

Adjunct Professors T.F. Carroll, Barend de Vries

Professorial Lecturers John Hardt, Theodore Suranyi-Unger, Jr.

Associate Professors Mary Holman, Ching-Yao Hsieh, R.Y.C. Yin, W.F.E. Long, S.E. Haber, R.M. Dunn, Jr.

Associate Professorial Lecturer H.H. Hinrichs

Assistant Professors J.T. Bennett, J.E. Fredland, Christopher Jehn

Adjunct Assistant Professor Henry Peskin

Assistant Professorial Lecturers D.M. Heien, P.B. Ginsburg

Lecturers T.R. Robinson, Virginia Benson

Bachelor of Arts with a major in Economics (Departmental).—Prerequisite: the Arts and Letters curriculum, page 76, including Econ 1–2.

Required: the general requirements, pages 81–85, and (1) Econ 101, 102 (to be completed no later than the junior year), and 198; (2) Econ 121 and 122, or 161 and 162, or 181–82; (3) 12 additional hours of second-group Economics courses, including Econ 121 if not previously elected, to be selected with the approval of the adviser; (4) Math 31 and 32; (5) Stat 111 and 112, or equivalent.

Master of Arts in the field of Economics.—Prerequisite: a Bachelor of Arts degree with a major in Economics from this University, or an equivalent degree.

Required: the general requirements, pages 90–96, including (1) Econ 203–4, 205; (2) 15 additional semester hours to be selected from other third-group Economics courses; (3) a Master's Comprehensive Examination in economic theory; (4) completion of a tool requirement (either the passing of a reading knowledge examination in one foreign language or the satisfactory completion of one of the following courses: Math 34, Stat 157–58, or Stat 197); and (5) a thesis (Econ 299–300).

Doctor of Philosophy in the field of Economics.—Required: the general requirements, pages 90–94, 96–98, including (1) Econ 201–2, 203–4, 205, 215–16, 379–80, and 21 additional semester hours of approved graduate course work in the student's areas of study; (2) passing of the General Examination in five areas (Microeconomic Theory, Macroeconomic Theory, the History of Economic Thought, and two other fields selected by the student and the doctoral program committee); (3) completion of the tool requirement (the passing of a reading knowledge examination in one foreign language plus the satisfactory completion of Math 34, Stat 157–58, or Stat 197; and (4) a dissertation to demonstrate the candidate's ability to do original research in one of the following fields: Econometrics, Economic Development, Economic History, Economic Policy, Economic Theory, History of Economic Thought,

Industrial Organization, International Economics, Labor Economics, Mathematical Economics, Monetary Economics, National Income Accounting, Natural Resources Economics, Public Finance, Regional Economics, and Soviet Economics.

Departmental prerequisite: Econ 1–2 is prerequisite to all other courses in Economics.

FIRST GROUP

1–2 **Principles of Economics** (3–3) Staff

Lecture (2 hours), recitation (1 hour). Survey of the major economic principles, institutions, and problems in contemporary life. Econ 1 is prerequisite to Econ 2. (Econ 1: fall and spring—day and evening. Econ 2: fall—evening; spring—day and evening.)

SECOND GROUP

101 **Intermediate Microeconomic Theory** (3) Watson, Yin

Analysis of supply, demand, and pricing. (Fall—day and evening; spring—day)

102 **Intermediate Macroeconomic Theory** (3) Holman, Yin

Theories of national income determination and growth. (Fall—day; spring—day and evening)

104 **History of Economic Thought** (3) Hsieh

History of the major schools of economic thought, influence of changing problems on the development of economic theory. (Spring—day)

105 **Economics Condition Analysis and Forecasting** (3) Kendrick

Theory and empirical analyses of economic trends and fluctuations, use of economic indicators and simple econometric models, workshop experience in an analysis of an aspect of the U.S. economy. (Fall—day)

121 **Money and Banking** (3) Jehn

Nature of money, credit, commercial banking, and other financial institutions in the U.S. monetary system. (Fall—day and evening, spring—day)

122 **Monetary Theory and Policy** (3) Jehn

Analysis of role of money in economic activity in terms of supply of and demand for loanable funds, determination of interest rates and price level. Problems of U.S. monetary policy. Prerequisite: Econ 121. (Spring—day)

*123 **Introduction to Econometrics** (3) Bennett

Construction and testing of economic models: regression theory, parameter estimation, and statistical techniques applicable to economic models. Empirical work by the student required. Prerequisite: Econ 101, 102, and a one-year sequence in calculus. (Fall or spring)

133 **Economy of the Soviet Union** (3) Hardt

Development and main features of economic life in the Soviet Union. (Fall—day)

*Interdepartmental course offered by the departments of Economics and Statistics

134 **Comparative Communist Economic Systems** (3) Hardt

Analysis of economic development and performance of the Soviet Union and other Soviet-type economies. Institutional aspects and quantitative measures of performance. (Spring—day)

136 **Natural Resources Economics** (3) Staff

Analysis of economic problems of natural resources development and utilization; including water resources development, environmental quality, recreation; planning and policy analysis with emphasis on role of non-market demands, externalities, public institutions, and benefit-cost analysis. Prerequisite: Econ 101. (Spring—day)

142 **Labor Economics** (3) Haber

Characteristics of American labor force, operations of labor market, wage theories and practices, impact of collective bargaining, causes and characteristics of unemployment, public policies and programs. (Fall—day)

*147 **Economic History of Europe** (3) Sharkey

European economic development since the Middle Ages; emphasis on the period following the Industrial Revolution. Evolution of capitalism and its impact upon the societies of Europe.

157 **Regional and Urban Economics** (3) Stewart

Analysis of the processes of interregional interaction, the urban hierarchy, urban structure, and policies for regional and urban development. (Spring—day)

158 **Industrial Organization** (3) Long

Analysis of the structures and production, pricing, and related practices of industries with emphasis on their significance and on appropriate economic policies. (Spring—day)

161 **Public Finance I** (3) Fredland

Theoretical and institutional analysis of government expenditures, taxation, and intergovernmental fiscal relations. (Fall—day)

162 **Public Finance II** (3) Fredland

Theoretical and institutional analysis of fiscal policy and debt management. (Spring—day)

165 **Economic Policy** (3) Stewart

Application of economic analysis to selected contemporary economic problems. (Fall—day)

169 **Introduction to the Economy of Communist China** (3) Yin

Background, organization, and operation of the economy. Appraisal of performance and analysis of problems of development. (Fall—day)

*179–80 **U.S. Economic History** (3–3) Sharkey

Process of economic growth from Colonial times to the present. Development of various sectors in the economy—such as agriculture, transportation, manufacturing, and banking—and their interdependence. Econ 179: 1607–1865. Econ 180: 1865 to present. (Academic year—day)

* Interdepartmental course offered by the departments of Economics and History.

181–82 **International Economics** (3–3) Aschheim, Galbreath, Dunn

Econ181: fundamentals of the monetary theory and pure theory of international trade. Econ 182: analysis of major contemporary problems including balance of payments, international liquidity, and economic development. (Academic year—day and evening)

185–86 **Economic History and Problems of Latin America** (3–3) Hinrichs

Analysis of present structures and problems of Latin American economies. (Academic year—evening)

198 **Proseminar in Economics** (3) Holman, Long

Examination of major topics in economic theory and the application of theory and analysis to policy problems. Emphasis on directed individual research which combines theoretical and empirical analysis. Open only to economics majors in their senior year. (Fall and spring)

199 **Independent Research in Economics** (3) Staff

Under the personal direction of an instructor. Limited to economics majors with demonstrated capacity. Prior approval of instructor required. (Fall and spring)

THIRD GROUP

Third-group Economics courses (except 217–18) are designed for graduate students in Economics or for graduate students with prescribed prerequisites.

201–2 **History of Economic Thought** (3–3) Burns, Hsieh

Critical analysis and interpretation of the development of economic theory from Aristotle through the 19th century. (Academic year—evening)

203–4 **Microeconomic Theory** (3–3) Watson, De Alessi

Econ 203: theories of the consumer and of the firm. Econ 204: theories of markets. (Econ 203 and 204: fall and spring—day and evening)

205 **Macroeconomic Theory** (3) Hsieh, Peakin

Classical, Keynesian, and modern theories of income determination and employment. (Fall and spring—evening)

207 **Business Cycle Analysis** (3) Kendrick

Empirical analysis of American business cycles; evaluation of the methodology and findings of the National Bureau of Economic Research. Statistical tests of theories of the business cycle. (Spring—evening)

208 **National Income** (3) Kendrick

Theory and measurement of economic aggregates within an integrated national income accounts framework, including balance sheets and wealth statements. (Spring—evening)

210 **Economic Methodology** (3) Stewart

Methodology of economics, review of selected theoretical issues in economic theory. Prerequisite: 6 semester hours of graduate courses in economic theory. (Spring)

215–16 **Mathematical Economics** (3–3) Solomon

Formulation and application of mathematical models in economic theory. Includes applications of the calculus, differential and difference equations,

matrix theory, mathematical programming, and probability theory. Prerequisite: Econ 203–4 and 205, and a one-year calculus sequence. (Academic year—evening)

217–18 **Survey of Economics** (3–3) Watson, Holman

For graduate students in fields other than economics; not open to graduate students in economics. Econ 217: price theory. Econ 218: income and employment theory. (Econ 217 and 218: fall and spring—evening)

223–24 **Monetary Theory and Policy** (3–3) Aschheim

Theory of monetary policy within the framework of contemporary American central banking. (Academic year—evening)

233 **Seminar: Agrarian Reform and Development in Latin America** (3) Carroll

Analysis of Agrarian reform movements and programs in the context of current development issues in Latin American countries. (Fall—evening)

234 **Seminar: Evaluation of Rural Development Projects in Latin America** (3) Carroll

Review of criteria for the design and evaluation of rural investment projects; case studies drawn from the experience of development agencies. (Spring—evening)

237 **Seminar: Economics of Natural Resources Policy** (3) Knetsch

Analysis of public policy problems relating to natural resources development and management. Specific topics include public investment criteria, time discounting problems, regional analysis, and project evaluation. (Fall—evening)

241–42 **Labor Economics** (3–3) Haber

Analysis of labor markets, theories of wages, impact of collective bargaining, causes of unemployment, public policies and programs. (Academic year—evening)

243 **Seminar: Manpower Policy** (3) Levitan, Mangum

Developments leading to expansion of public investment in manpower resources; evaluation of goals and operations of publicly supported programs; role of federal, state, and local governments and private institutions. (Fall—evening)

251–52 **Economic Development** (3–3) de Vries

Theories and problems of economic growth; special attention to the underdeveloped countries. (Academic year—evening)

253 **Productivity Analysis** (3) Kendrick

Concepts, measurement, and analysis of productivity in business and government at aggregate and organizational levels. (Fall—evening)

257 **Regional and Urban Economics** (3) Stewart

Theory of location of economic activities, analysis of interregional equilibrium and dynamics of regional growth, structure and processes of urban development. (Spring—evening)

259 **Income Distribution** (3)

Theoretical and empirical analysis of income distribution, including analysis of policies related to income inequality. Open to advanced undergraduate Economics majors. (Fall—evening)

261 **Welfare Economics** (3) Stewart

Theories of welfare economics and their applications to public policy; analysis of selected topics in public policy. (Fall—day)

263 **Theory of Public Finance I** (3) Fredland

Allocation and distribution aspects of government budget policy including critical analysis of theories and principles of expenditures, taxation, and intergovernmental fiscal relations. (Fall—evening)

264 **Theory of Public Finance II** (3) Fredland

Stabilization aspects of government budget policy: analysis of effects of fiscal policy and debt management on level of employment, prices, and rate of economic growth. (Spring—evening)

265 **Economics of Regulatory Policy** (3) Staff

Analysis of economic impact of government regulatory policies and practices. (Fall—evening)

266 **Antitrust Policy** (3) Staff

Historical background; economics of monopoly, impact of antitrust legislation and policy.

267 **Seminar: Soviet Economy** (3) Hardt

Development of the Soviet-type economy. Organization, policies, and problems: monetary, fiscal, production, allocative, foreign trade, economic growth. Workshop: case studies on sectoral or problem areas. Prerequisite: graduate status; Econ 101, 102, 133, and 134, or equivalent; permission of instructor. (Fall—evening)

268 **Seminar: Economic Theory and Development in Communist Countries** (3) Hardt

Appraisal of the Soviet-type model for economic development in the institutional framework of Soviet and other communist processes of economic development. Workshop: case studies on Eastern European, Chinese, and other communist economies. Prerequisite: graduate status; Econ 101, 102, 133, and 134; or equivalent; permission of instructor. (Spring—evening)

269 **Economy of Communist China I** (3) Yin

Analysis of organization, operation, policies, and problems. Development of the economy under communism. (Fall—evening)

270 **Economy of Communist China II** (3) Yin

Continuation of Econ 269, examining critical problems of development. Prerequisite: Econ 269 or permission of instructor. (Spring—evening)

*275 **Econometrics I: Introduction** (3) Peskin, Bennett

Single equation models of economic behavior and associated econometric problems. Use of statistical methods for testing economic hypotheses and estimating parameters. Problems stemming from the use of nonexperi-

* An interdepartmental course offered by the departments of Economics and Statistics.

mental data. Introduction to simultaneous equations problems. Empirical work by student required. Prerequisite: Econ 101, 102; Stat 157–58 or equivalent; or permission of instructor. (Fall—day and evening)

Bennett

*276 **Economics II: Simultaneous Equation Models** (3)
(Formerly Econometrics II: Theory and Method)
Continuation of Econ 275. Economic models and simultaneous equations systems. Identification of parameters, least squares bias, and alternative estimation methods. Block recursive systems. Prerequisite: Econ 275. Recommended: a course in matrix theory. (Spring—evening)

Dunn

281–82 **International Economics** (3–3)
Econ 281: theory of international trade and factor movements. Econ 282: theory of balance-of-payments adjustment. (Academic year—evening)

Staff

285–86 **Economic Development of Latin America** (3–3)
Current policies and programs, capital formation, public and private; foreign loans and investment; social and technological preconditions of investment.

Rodríguez

287 **Seminar: Problems in Latin American Civilization** (3)
Interdisciplinary seminar guided by a specialist within the methodology of his chosen discipline; each student writes a report on some aspect of a key theme (i.e., Nationalism) in Latin America's experience. Admission by permission of instructor. (Spring—day)

Staff

299–300 **Thesis Research** (3–3)
(Fall and spring)

FOURTH GROUP

Fourth-group Economics courses are limited to graduate students and are primarily for doctoral candidates. They are offered as the demand requires.

Watson, De Alessi

312 **Seminar: Price Theory** (3)
Discussion of topics of price theory from recent journal articles.

Burns

313 **Seminar: Economic Thought in the 20th Century** (3)
Continuation of Econ 201–2. Principal trends in English, Continental, and American economic thought during the present century.

Solomon

315 **Seminar: Topics in Mathematical Economics** (3)
Intensive study of selected topics including economic activity analysis, risk and uncertainty, and other topics of current interest. Prerequisite: Econ 215–16.

Aschheim

321 **Seminar: Monetary Theory** (3)
Recent developments in monetary theory.

Staff

341 **Seminar: Labor Economics** (3)
Current problems in theory and policy.

Staff

363 **Seminar: Public Finance** (3)
Selected topics of current interest.

* An interdepartmental course offered by the departments of Economics and Statistics.

*378 **Seminar: Topics in Econometrics** (3) Staff

A research seminar covering current econometric literature and special topics. Admission by permission of instructor.

†379–80 **Readings in Economic History** (3–3) Sharkey

Prerequisite: the appropriate second-group preparation and consent of instructor. (Academic year—evening)

390 **Seminar: International Economic Theory** (3) Staff

Examination of recent contributions in this field.

391 **Seminar: International Economic Policy** (3) Staff

Topics selected from current significant policy problems.

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Education

Professors B.S. Root *(Emeritus)*, G.L. Angel, W.T. Carroll, Carol St. Cyr, Mary Ellen Coleman, H.G. Detwiler *(Chairman)*, Daniel Smick, R.E. Baker, Martha Rashid, Rodney Tillman, Anthony Marinaccio, L.H. Elliott, Leonard Nadler, Marcella Brenner

Professorial Lecturers J.B. Holden, W.W. Chase, W.E. Amos, D.D. Darland, Albert Eiss

Associate Professors J.G. Boswell, Margaret McIntyre, C.E. Vontress, R.J. Frankie

Associate Professorial Lecturers LuVerne Walker, Beverly Heinle, Martha Ware, P.E. Arsenault, K.W. Rollins, David Iwamoto, W.W. Burke, A.C. Jensen, Samuel Kavruck

Assistant Professors Gloria Horrworth, C.B. Reed, Donald Linkowski, Dorothy Moore, Lawrence Winkler, Ruth Peterson

Assistant Professorial Lecturers R.J. Kubalak, Shirley McCune, J.D. Gates, Marjorie Daly, Marianne Phelps, Helena Lietwiler, Carla Heymsfeld, Anne Hoyle, V.E. Greaver, R.E. McNelis, Norma Ettington, Margery West

Instructors G.D. Wiggs, Nancy Roche

Programs of study leading to the degrees of *Bachelor of Arts in Education, Master of Arts in Education, Master of Arts in Teaching, Education Specialist,* and *Doctor of Education* are offered by the School of Education (see pages 101–25).

SECOND GROUP

Educ 136, 137, 138, 139, 140, 142, 144, and 146 are special methods courses which are to be elected in the senior year by students in the secondary school curriculum

* An interdepartmental course offered by the departments of Economics and Statistics.
† An interdepartmental course offered by the departments of Economics and History.

after substantial preparation in the teaching fields concerned. Course requirements and hours of credit vary with license requirements. Practices of successful teachers studied; actual teaching content as found in current texts and courses of study reviewed. Prerequisite to all special methods courses: Educ 108, 123, and 131. Additional prerequisites are stated under each course.

108 **Human Development, Learning, and Teaching** (3) Staff

Lecture (2 hours), conference (1 hour), field work (3 hours). Principles of effective teaching based on an understanding of human development and the nature of learning. Prerequisite: Psyc 22. (Fall and spring—day and evening)

111 **Elementary School Curriculum and Methods** (15) Moore and Staff

For seniors. Curriculum and methods of teaching in the elementary school: reading, childrens' literature, mathematics, science, language arts, social studies, music, art, physical education. Pre-student teaching one and one-half days a week. Prerequisite: Educ 108 and 123. (Fall—day)

112 **Educational Measurement** (3) Staff

Scope, needs, services to students, selection and construction of teacher-made tests, interpretation of tests for evidence purposes. Prerequisite: Educ 108 and 123. (Fall and spring—day and evening)

113 **Elementary School Art** (3) Heinle

For undergraduates in the elementary school curriculum. Materials and methods. Material fee, $5. (Spring: lecture and laboratory (3 hours) —evening, field work—as arranged)

114 **Elementary School Music** (3) Daly

Lecture (2 hours), field work (2 hours). For undergraduates in the elementary school curriculum. Materials and methods.

*115 **Elementary School Teaching of Reading** (3) Staff

Introduction to methods, techniques, materials, and activities essential to a good elementary school reading program. Prerequisite: Educ 108 and 123, or teaching experience.

119 **Elementary School Curriculum** (12) Brenner and Staff

Limited to students in the M.A.T. Program. Includes the teaching of reading, language arts, social studies, science, mathematics, music, art, and physical education. Appropriate field experiences. (Fall—day)

123 **Society and the School** (3) Brenner, St. Cyr, Tillman

Lecture (2 hours), conference (1 hour), field work (2 hours). Historical and social development of education at local, national, and international levels; cooperation of the school with other community agencies; functions of school personnel. (Fall and spring—day and evening)

*128 **Children's Literature** (3) Walker, McIntyre

Newer books for children and the children's classics, contribution of literature to child development, children's original expressions. (Spring, lecture (2 hours)—evening, field work (2 hours)—as arranged)

* This course may not be taken by students who have completed or plan to enroll in Educ 111.

130 **Internship in Elementary Education** (6) Brenner, Horrworth

Limited to students in the M.A.T. Program. Full-time teaching in an elementary school under cooperative supervision of the school system and the University staff. Admission by permission of instructor. Prerequisite: Educ 119 or equivalent. (Spring)

131 **Secondary School Principles and Methods** (3) Boswell

For seniors. Classroom management and teaching techniques for initiating, guiding, and evaluating learning activities. Prerequisite: Educ 108 and 123. Field work in the public schools to be arranged. (Fall and spring—day)

132 **Student Teaching in Early Childhood Schools** (6 to 9) McIntyre

For seniors. Admission by permission of instructor. Prerequisite: Educ 111 or equivalent. (Fall and spring)

133 **Supervised Experience in Education** (3 to 6) Staff

Field work, internship, and instructional practice. Educ 133A: adult education and human resource development (Nadler, Wiggs); Educ 133B: student personnel work (Kirkbride); Educ 133C: higher education (Angel, Frankie). Admission by permission of instructor. (Fall and spring)

134 **Student Teaching in Secondary Schools** (6 to 9) Staff

For seniors. Sections A, B, and C are for full-time academic majors. Section D is for physical education majors. Admission by permission of instructor. Prerequisite: Educ 131. (134A: fall; 134A, 134B, 134C, and 134D: spring)

135 **Student Teaching in Elementary Schools** (6 to 9) Moore and Staff

For seniors. Admission by permission of instructor. Prerequisite: Educ 111 or equivalent. (Fall and spring)

136 **Teaching English in Secondary Schools** (3) McNelis

Prerequisite: 18 semester hours in English. (Spring: lecture (2 hours)—evening, field work (2 hours)—as arranged)

137 **Teaching Speech** (3) Henigan

Prerequisite: 18 semester hours in speech or permission of instructor. (Spring: lecture (2 hours)—evening, field work (2 hours)—as arranged)

138 **Teaching Social Studies in Secondary Schools** (3) Boswell

Prerequisite: 24 semester hours of social studies. (Spring: lecture (2 hours)—evening, field work (2 hours)—as arranged)

139 **Teaching Art in Secondary Schools** (3) Heinle

Lecture (2 hours), laboratory (2 hours). Prerequisite: 24 semester hours of Art. Material fee, $4.50. (Spring—evening)

140 **Teaching Mathematics in Secondary Schools** (3) Gates

Prerequisite: mathematics through calculus. (Spring: lecture (2 hours)—evening, field work (2 hours)—as arranged)

142 **Teaching Music in Secondary Schools** (3)

Prerequisite: 24 semester hours of Music.

144 **Teaching Science in Secondary Schools** (3) Eiss
Prerequisite: 24 to 40 semester hours of science. (Spring: lecture (2 hours)—evening, field work (2 hours)—as arranged)

146 **Teaching Foreign Languages** (3) Arsenault
Prerequisite: 18 semester hours of one foreign language. (Spring: lecture (2 hours)—evening, field work (2 hours)—as arranged)

152 **Curriculum for Early Childhood** (3) McIntyre
Admission by permission of instructor. (Spring—evening)

153 **Early Childhood Classroom Management** (3) McIntyre
Admission by permission of instructor. (Fall—evening)

154 **Community Resources for the Young Child** (3) McIntyre
Admission by permission of instructor. (Spring—late afternoon)

*196 **Urban Ecology Workshop** (6)
Legal, scientific, political, and ethical aspects of specific environmental issues in the Washington metropolitan area.

THIRD GROUP

Departmental prerequisite: A degree from an accredited institution is prerequisite to all third-group courses in Education. Adequate professional preparation is prerequisite to all third-group courses in Education except for those courses limited to students in the M.A.T. Program.

201 **Seminar: International Education** (3) Moore
(Formerly Educ 160)
Survey of foreign educational systems and cultures; development of world-mindedness related to selected foreign countries. Embassy resources will be utilized.

203–4 **Comparative Education** (3–3) Staff
Comparison of United States with foreign educational systems, particularly those of Russia, West Germany, Denmark, Switzerland, France, the British Isles, Canada, and Australia.

205–6 **The Curriculum** (3–3) St. Cyr
For experienced teachers. Educ 205: curriculum foundations and issues, comparison of curriculum patterns. Educ 206: curriculum development in subject areas, group consideration of student problems. (Academic year—evening)

207 **Curriculum Materials** (3 to 6) St. Cyr
For experienced teachers. Construction of courses of study and classroom teaching aids, with direct application to students' situations.

208 **Human Development** (3) Rashid
Contribution of various disciplines to an understanding of human development throughout the life span; emphasis on practical implications of relevant research. (Fall—day; spring—evening)

* Offered jointly by the Department of Education and the GW-Washington Project. Hum 196 does not have a laboratory session; therefore students receive a maximum of 4 semester hours of credit for this course. Educ 196 has a laboratory session on curricular materials for elementary and secondary school teachers; therefore teachers receive 2 additional hours of credit for a total of 6 semester hours for this course.

209 **Child Development** (3) **Rashid**

Interdisciplinary approach to child development. Analysis, interpretation, and practical implications for instruction of research in disciplines contributing to a knowledge of child development. (Fall—evening)

210 **Adolescent Development** (3) **Rashid**

Interdisciplinary approach to adolescent growth and development. Analysis, interpretation, and practical implications for instruction of research in disciplines contributing to a knowledge of the adolescent. (Spring—evening)

212 **Educational Measurement** (3) **Staff**

Basic measurement techniques; construction, selection, administration, and interpretation of objective and essay-type examinations; statistical analysis of test results; laboratory use of test instruments.

213–14 **History of Education** (3–3) **Greaver**

Educ 213: European backgrounds of American education. Educ 214: evolution of the American school system. (Academic year—evening)

216 **Education of Slow-learning Children** (3) **Amos**

Identification, nature, and needs of slow-learning elementary and junior high school children. Emphasis on diagnosis and treatment of learning difficulties.

217–18 **Philosophy of Education** (3–3) **Darland**

Educ 217: to help students formulate a personal philosophy of education. Educ 218: social foundations of education—forces that shape policies and offerings of the school. (Academic year—Saturday morning)

219 **Elementary School Classroom Procedures** (3) **Baker**

Current classroom practices; emphasis on planning, unit teaching, techniques in discipline; individual and group evaluation techniques, resources for learning, providing for individual differences.

220 **Elementary School Teaching Foundations** (9) **Brenner, Horrworth**

(Formerly Educ 107)

Limited to students in the M.A.T. Program. A block course, dealing with the content of traditional courses in educational psychology; history of education; human development, learning, and teaching; society and the school; introduction to elementary education. 135 class hours, supplemented by field experience.

223 **Foundations of Reading Instruction** (3) **Coleman**

(Formerly Reading Problems)

Historical and psychological background; evaluation of recent methods, materials, and techniques in teaching reading; demonstrations of diagnostic and teaching techniques. (Fall—evening)

224 **Reading Problems** (3) **Coleman**

Elementary school reading difficulties; classroom and clinical techniques in testing and teaching. Prerequisite: one or more years of recent teaching experience and a previous course in reading or language arts. (Spring—evening)

226 **Reading in Secondary School and College** (3) Coleman, Eitington

Methods, techniques, and materials necessary for developing efficient reading skills, including skills in content subjects; organizing and evaluating reading programs. (Spring—evening)

227 **Basic Issues in Elementary Education** (3) Baker

Identification, definition, and analysis of some of the most important problems facing the contemporary American elementary school. (Fall—evening)

228 **Instructional Areas in Elementary Education** (3) Baker

Objectives, organization, content, and teaching methods in language arts, arithmetic, social studies, science, arts and crafts, health and physical education. (Spring—evening)

229 **Administration of Elementary Education** (3) Carroll

For experienced teachers and administrators. Achieving instructional objectives, organizing and servicing teaching activities, coordinating school and community life. (Fall—evening)

230 **Intern Seminar: Elementary School Teaching** (3) Brenner, Horrworth

Limited to students in the M.A.T. Program. Scheduled weekly meetings for discussion of common problems and for cooperatively planned work on areas of individual and group needs. (Spring—Saturday morning)

231 **Secondary School Classroom Procedures** (3) Boswell

Current classroom practices: teacher-pupil planning, group procedures, initiatory and culminating activities, individual and group evaluation techniques, teaching aids, etc.; review of recent literature.

232 **Supervision of Elementary Education** (3) Carroll

For experienced teachers and administrators with two or more years of teaching experience. Review of modern supervisory concepts including practices in the operation of the elementary school. (Spring—evening)

233 **Audio-visual Education** (3) Kubalak

Lecture (2 hours), laboratory (1 hour). Selection, evaluation, and use of audio-visual materials; administrative problems in care, operation, maintenance, and use of such materials and equipment. Material fee, $7. (Spring—Saturday morning)

241 **Education of the Gifted** (3) Amos

For classroom teachers. Nature and discovery of giftedness, provisions for the gifted in regular classes, experimental projects.

243 **Human Relations in Education** (3) Marinaccio

Principles and practices in human relations between and among learner, teacher, other school personnel, and parents.

245 **School and Community** (3) Angel

The school as an important member of a team of social agencies that builds the community. (Spring—evening)

247 **Adult Occupational Education** (3) Wiggs
(Formerly Vocational Education)

Development, current concepts, agencies involved, problems, and trends in adult vocational-technical-occupational education in the United States and foreign countries. (Fall—evening)

251 **Foundations of Guidance and Personnel Services** (3) Detwiler

Introductory survey: definitions, scope, principles, historical background, organization, services, emerging trends, and issues. (Fall and spring—evening)

252 **Organization and Administration of Guidance Services** (3) Vontress

For guidance directors, supervisors, and experienced school counselors who hope to qualify for such positions. Prerequisite: a minimum of 15 semester hours of approved graduate work in measurement and guidance. (Spring—Saturday morning)

253 **Analysis of the Individual for Purposes of Counseling** (3) Winkler

Detailed study of individual analysis and appraisal techniques. Development of systematic case study. Prerequisite: Educ 112 or equivalent. (Fall and spring—evening)

254 **The Middle School** (3) Staff

Purposes, organization, core program, guidance, developing course of study, extra-classroom activities. (Fall—evening)

255–56 **Secondary Education** (3–3) Root

Educ 255: current proposals for improvement of secondary education. Educ 256: current problems in each subject-matter field. (Academic year—evening)

257 **Educational and Occupational Development** (3) Vontress

Theories of career development; structure of education, training, and work in the United States; sources, forms, collection, evaluation, and dissemination of educational-occupational information. (Fall—late afternoon; spring—evening)

258 **Techniques of Counseling** (3) Detwiler, Vontress

Intensive study of educational and psychological processes involved in counseling interviews. Vocational, educational, and personal counseling problems. Prerequisite: 12 semester hours in testing and guidance, including Educ 253 and 257. In exceptional cases Educ 253 or 257 may be taken concurrently with 258. (Fall and spring—evening)

259 **Secondary School Administration** (3) Marinaccio

For experienced teachers and administrators with two years of secondary school teaching. Survey of administration including practices of the modern high school. (Fall—evening)

260 **Secondary School Supervision** (3) Marinaccio

For experienced teachers and administrators with two or more years of teaching experience. Review of modern supervisory concepts including practices followed in the operation of the school. (Spring—evening)

261 **Practicum in Guidance** (3 to 6) Vontress, Detwiler

Supervised practical instruction. Prerequisite: graduate work in counseling. Admission by permission of Department Chairman. (Fall and spring)

263 **Human Resource Development: Training and Education** (3) Wiggs

Concepts and purpose, historical backgrounds, emerging roles of human resource development personnel, program areas. Prerequisite: adequate professional preparation or two years of experience in training, education, and development. (Fall—evening)

264 **Program Planning in Human Resource Development** (3) Wiggs

Training, education, and development programs for various client systems will be planned using the critical events technique conceptual model. Field work including implementation of programs for actual client system. Prerequisite: Educ 263 and permission of instructor. (Spring—evening)

269–70 **Business Management of Schools I–II** (3–3) Marinaccio

Educ 269: philosophy, responsibilities, and functions of the business management office in public education institutions. Educ 270: practicum in educational business management. (Academic year—late afternoon)

271 **The Teacher and School Administration** (3) Carroll, Marinaccio

Role of federal, state, and local administrative units; school finance; legal controls; school plant; public support; improving teaching conditions. (Fall—evening; spring—Saturday morning)

272 **The Teacher and School Supervision** (3) Carroll, Marinaccio

Nature, organization, human relationships, and techniques. (Fall—Saturday morning; spring—evening)

273–74 **Teacher Education** (3–3) Boswell

Educ 273: aims, objectives, and basic issues; study of outstanding and experimental programs. Educ 274: recruitment and selection, general education, teaching-field preparation, professional sequences, laboratory experiences. (Academic year—evening)

275 **Seminar: School Finance** (3) Carroll

Educational financial theory, practice, and control, including methods of financing. (Fall—evening)

276 **Seminar: Public Relations in School Administration** (3) Carroll

Purposes, gathering materials, disseminating agencies, publicity media, public participation in policy-making. (Spring—evening)

278 **School Law** (3) Ware

Sources and scope of school law; legal rights and responsibilities of teachers, pupils, and taxpayers. Other legal problems of major interest to the group. (Spring—evening)

279 **Adult Education** (3) Nadler

Current concepts and objectives, historical development, agencies involved, field personnel, clients, programs on all levels—community through international. (Fall—evening)

280 **Program Planning in Adult Education** (3) Wiggs
(Formerly Adult Education)
Determining educational needs for adults at all levels in school and non-school agencies; planning programs and instruction; budgeting and scheduling of adult programs. Adult advisory committees, community surveys. Field work with actual sponsoring agency. Prerequisite: Educ 279 and permission of instructor. (Spring—evening)

283 **Higher Education in the United States** (3) Angel
Development, scope, purposes, present status, programs, and trends in higher education in the United States. (Fall—evening)

284 **Administration of Higher Education** (3) Angel, Frankie, and Staff
Government, organization, and administration of colleges and universities. (Spring—evening)

285 **Student Activities** (3) Angel
Nature and purposes of selected activities—homeroom, clubs, assemblies, school publications, student council, interscholastic contest; attention to sponsorship, participation, finance, and evaluation.

287–88 **Clinical Study of Reading Problems** (3–3) Coleman, Peterson
For advanced students. Diagnostic and corrective work under supervision in the Reading Center. Prerequisite: Educ 223 and 224 or 226, or equivalent. Material fee, $10 a semester. (Academic year—evening)

289 **Supervisory Problems in Reading** (3) Peterson
For experienced teachers, principals, supervisors, and superintendents. Problems in planning, reorganizing, and improving the total reading program and in promoting cooperative staff effort toward increasing teaching efficiency.

290 **Diagnosis and Instruction—Severe Reading Problems** (3) Peterson
For experienced teachers. Case studies of children and/or adults with severe reading problems, planning and implementing instructional programs. Admission by permission of instructor. Material fee, $10. (Fall—evening)

291 **Planning the School Plant** (3) Chase
Selection of sites; evaluation of existing buildings; utilization of present facilities; adaptation to curricular needs; building, operation, and maintenance problems.

293–94 **Research and Independent Study** (3–3) Staff
Individual research under guidance of a staff member. Program and conferences arranged with an instructor. (Academic year)

295 **Research Methods and Procedures** (3) Staff
Required of all candidates for graduate degrees in Education. To be taken early in the graduate program. Prerequisite: Educ 112 or equivalent. (Fall and spring—day and evening)

296 **Seminar: Educational Research** (3) Staff
Analysis of scientific approaches to problems in education and evaluation of the application of research techniques. Required of all candidates for

the Ed.D. degree. Prerequisite: Educ 295 or equivalent. (Fall and spring—evening)

297 **Personnel Administration** (3) Carroll

Organization and administration of personnel programs for educational institutions. Basic philosophy, principles, responsibilities, and functions.

298 **Seminar: Personnel Administration** (3) Carroll

Research: policies, rules and regulations, staff organizations, negotiations.

299–300 **Thesis Research** (3–3) Staff

Required of Master of Arts in Education candidates writing Master's theses. (Fall and spring)

301 **Data Processing in Education** (3) McCarthy

Machine accounting and computer technology for counselors, teachers, and administrators.

316 **Curriculum Developments in Elementary School Social Studies** (3 to 6) Moore

For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective elementary school social studies curriculum. Admission by permission of instructor.

317 **Curriculum Developments in Elementary School Science** (3 to 6) St. Cyr

For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective elementary school science curriculum. Admission by permission of instructor.

320 **Curriculum Developments in Elementary School Mathematics** (3 to 6) St. Cyr

For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective elementary school mathematics curriculum. Admission by permission of instructor. (Spring—evening)

331 **Development of the Young Child** (3) McIntyre

Lecture and laboratory. Basic concepts and problems of child development; observation, behavior patterns, child study. (Fall—evening)

332 **Curriculum for Early Childhood** (3 or 4) McIntyre

Lecture and field. Language arts, science, mathematics, social studies, and the creative arts, emphasizing adaptation to skills and needs of the young child; review of new programs. (Spring—evening)

333 **Early Childhood Classroom Management** (3 or 4) McIntyre

Lecture and field. Planning, reporting, records, equipment, space use, working with parents, and survey of types of preschools. (Fall—evening)

334 **Community Resources for the Young Child** (3 or 4) McIntyre

Lecture and field. Use of community agency services and specialists in pertinent fields. (Spring—late afternoon)

335 **Practicum in Early Childhood Education** (3 to 6) McIntyre

Supervised teaching and seminar in the early childhood field. Prerequisite: Educ 331, 332, and 333; or equivalent; and permission of instructor. (Fall and spring—day)

336 **Practicum in Reading** (3 to 6) Coleman

Supervised experience in testing and teaching in the Reading Center. Approximately 120 class hours required for 3 semester hours of credit. Admission by permission of instructor. (Fall and spring)

341 **Cognitive Models and Instructions** (3) Rashid

Cognitive models (Guilford, Praget, etc.) are analyzed as the theoretical basis for planning instructional episodes appropriate at various levels—childhood through young adulthood. (Fall—late afternoon)

342 **Language Development** (3) Rashid

Nature of language development; role of language in the socialization process. (Spring—late afternoon)

354 **Counseling of Minority Groups** (3) Vontress

Consideration of problems and approaches related to counseling cultural and racial minorities in American society; emphasis on counseling the disadvantaged in urban areas.

355 **Counseling in Groups** (3) Staff

For experienced counselors and psychologists. Peer-group relationships with emphasis on adolescent groups. Principles of group dynamics as related to interaction within groups. Techniques and practice in group counseling. (Fall—late afternoon)

356 **Seminar: Guidance and the Disciplines** (3) Staff

For experienced counselors. Exploring the foundations of guidance through the disciplines of psychology, sociology, economics, anthropology, and philosophy.

357 **Mental Hygiene** (3) Vontress, Sinick

Mental health problems; emphasis on needs of counselors, teachers, and others working with children and adolescents. (Fall and spring—evening)

361 **Medical Aspects of Rehabilitation Counseling** (3) Sinick

Etiology, symptomology, and treatment of chronic and traumatic disorders with rehabilitation counseling implications. Admission by permission of instructor. (Fall—day)

362 **Client Evaluation in Rehabilitation Counseling** (3) Sinick

Test and nontest methods of furthering client and counselor understanding. Prerequisite: Psyc 131. (Spring)

363 **Psychosocial Aspects of Rehabilitation Counseling** (3) Linkowski

Impact of congenital and later disabilities on attitudes, self concepts, and motivations. Implications for rehabilitation counseling. Admission by permission of instructor. (Fall—day)

365–66 **Field Work in Rehabilitation Counseling** (3–3) Sinick

Field work of one full day a week. Educ 365: concurrent seminar covering history, philosophy, and introduction to practices. Educ 366: con-

current seminar covering job analysis, placement, and follow-up. Prerequisite to Educ 366: Educ 365. Admission by permission of instructor. (Academic year)

367–68 **Internship: Rehabilitation Counseling** (6–6) Linkowski

Supervised practice of three full days a week, with seminar providing integration of theory and practice. Prerequisite: Educ 365–66. (Academic year)

369 **Professional Issues in Rehabilitation Counseling** (3) Sinick

Culminating seminar covering professional problems and ethical issues. Prerequisite: Educ 367. (Spring)

371 **Principles and Methods of College Teaching** (3) Frankie

General principles, methods, techniques, and experimental instructional media for teaching at the college and university level. (Fall—evening)

372 **Internship in College Teaching** (3 to 6) Frankie

Supervised experience in a selected area of college teaching. Prerequisite: Educ 371. Admission by permission of instructor. (Spring)

373 **The Junior-Community College** (3) Angel, Frankie

Development, organization, curriculum, role, issues, and problems of the junior-community college. (Fall—evening)

374 **Current Issues in Higher Education** (3) Elliott, Angel

Investigation of current issues in higher education. Fall semester open to students not majoring in higher education; spring semester open only to students majoring in higher education. Prerequisite: Educ 283, 284. (Fall and spring—evening)

375 **Introduction to Student Personnel Work** (3) Kirkbride

Student personnel services in American higher education. Personnel work as an integral part of the college program; introduction to the literature of the field. (Fall—day)

376 **Student Personnel Work with College Groups** (3) Kirkbride

Principles and procedures of personnel work with campus groups. Promotion, limitation, and coordination of campus group activities; development of student leadership. (Spring—day)

377 **Practicum in Student Personnel Work** (3) Phelps

Supervised practical experience in student personnel services. Admission by permission of instructor. (Fall and spring)

378 **Practicum in Teacher Education** (3 to 6) Brenner, Boswell

For selected, experienced teachers. Supervised practical experiences in interpersonal relationships in the school setting. Correlated research and reporting. Field work relevant to student's professional needs, to be arranged. (Fall and spring—day)

379 **Practicum in Adult Education** (3 to 6) Nadler

Supervised practical experience in various forms of adult education and human resource development. Admission by permission of instructor. (Fall and spring)

380 **Sensitivity Training: Laboratory Method** (3) McCune

A sensitivity learning experience in human relations using unstructured group experience, individual feedback, experimentation, and practice. Admission by permission of instructor. (Fall—evening)

381 **The Adult as a Learner** (3) Angel, Wiggs

Psychology of learning as applied to adults; effect of age on learning; physical and social environment in adult education situations. (Fall—evening)

382 **Methods in Adult Education** (3)

Methods, techniques, and devices in adult education; traditional methods, developing action-oriented learning situations, programmed instruction, and systems approach in developing training materials. (Spring—evening)

383 **Counseling of Adults** (3) Wiggs

Theories and practical applications of occupational counseling, emphasizing distinct needs of adults and young adults; primarily intended for counselors in military, government, business, and industrial organizations. (Spring—evening)

384 **Evaluation of Adult Education** (3)

Measurement and evaluation of adult education in school and nonschool agencies—business, industry, government, voluntary, and community. (Spring—evening)

386 **Current Issues in Adult Education** (3) Holden

Investigation of current issues and trends in adult education. (Spring—evening)

387 **Administration of Adult Education** (3) Staff

Program administration, staff recruitment and development, fiscal operations, facilities, and maintenance of effective community relations. (Spring—evening)

390 **Legal Problems in Higher Education** (3) Frankie

Investigation of legal problems in higher education related to administration, students, faculty, and academic program.

391 **College and University Curriculum** (3) Frankie

Development, patterns, creative design, issues, problems, evaluation, and trends in the higher education curriculum. (Fall—Saturday morning)

392 **Financing Higher Education** (3) Frankie

Analysis of private, state, and federal revenue sources; student income, budgets, computation of unit costs, means of supporting legislative and federal requests, and measurement of economic returns. (Spring—evening)

393 **Practicum in Higher Education** (3 to 6) Angel

Supervised field experiences in higher education; reports and conferences. Admission by permission of instructor. (Fall and spring)

394 **Administration and Governance in Higher Education** (3) — Marinaccio
Organization and administrative structures and patterns in higher education. Prerequisite: Educ 284. (Fall—late afternoon)

397 **Internship: Elementary Administration** (3 to 6) — Carroll
Service in a school situation directed by the University and school system to integrate theory and practice. (Fall and spring)

FOURTH GROUP

A Master's degree from an accredited institution is prerequisite to all fourth-group courses. All seminars listed in the fourth group are open to doctoral candidates or other post-Master's degree students with approval of instructor. Study is individually planned on the basis of previous study and experience in the subject field to attain an advanced level of competence and meet identified professional needs or field requirements in a doctoral program.

Each of the following courses is offered fall and spring. Each course may be repeated for credit.

401 **Seminar: History of Education** (arr.) — Greaver

403 **Seminar: Philosophy of Education** (arr.) — Rashid

405 **Seminar: Human Growth and Development** (arr.) — Baker

411 **Seminar: Elementary Education** (arr.) — Root

413 **Seminar: Secondary Education** (arr.) — Nadler

421 **Seminar: Adult Education** (arr.) — Marinaccio, Angel

422 **Seminar: Higher Education Administration** (arr.) — Angel

423 **Seminar: Higher Education** (arr.) — Kirkbride

424 **Seminar: Personnel Work in Higher Education** (arr.) — Boswell, Baker

425 **Seminar: Teacher Education** (arr.) — Nadler

427 **Seminar: Human Resource Development** (arr.) — Carroll
(Formerly Seminar: Employee Development)

429 **Seminar: Educational Personnel Administration** (arr.) — Carroll, Marinaccio

431 **Seminar: Administration** (arr.) — Carroll, Marinaccio

433 **Seminar: Supervision** (arr.) — Carroll

434 **Seminar: Elementary Supervision** (arr.) — Carroll

435 **Seminar: Elementary Administration** (arr.) — Marinaccio

436 **Seminar: Secondary Supervision** (arr.) — Marinaccio

437 **Seminar: Secondary Administration** (arr.) — St. Cyr

441 **Seminar: Curriculum** (arr.) — Detwiler, Vontress

443 **Seminar: Guidance and Counseling** (arr.)

445 **Seminar: Research and Evaluation** (arr.) Rashid, Linkowski

491 **Dissertation Research** (arr.) Staff

Preparation of a research outline; research and writing of an approved doctoral dissertation under the direction of major adviser and dissertation committee.

English

Professors C.D. Linton, C.W. Cole, R.H. Moore, J.H. Coberly, P.H. Highfill, Jr., J.G. Allee, Jr., J.P. Reesing, Jr., Milton Crane, E.R. Weismiller, R.N. Ganz, Jr., G.E. McCandlish *(Chairman)*

Adjunct Professor J.C. Broderick

Associate Professors W.L. Turner, Muriel McClanahan, Elizabeth Wright, A.E. Claeyssens, Jr., R.C. Rutledge

Assistant Professors J.A. Quitslund, J.W. Claiborne, Fredrica Rosenberg, Judith Plotz, Nancy Bunge, T.M. Scanlan, C.W. Sten

Adjunct Assistant Professors Barbara Dunham, Sister Mary Slattery

Assistant Professorial Lecturer J.J. Monroe

Instructors Margaret Bonney, Evelyn Lynch, R.L. Dabney, Hazel Eagle, Judith Carlberg, Judith Lefkowitz, Agnes Cannon, R.L. Combs, M.E. Green, J.J. O'Connell, Jr.

Lecturers Edgar Boling, Jr., Leah Douthitt, Alice Rice, Elna Broffman, M.M. Feick, Mary Cherry, Joan Gimlin, Mary Turner, P.A. Woodard, Elizabeth Caffin, Carolyn Boiarsky, Janet Carroll, Mary Crouch, Heather Faulkner, J.E. Foreman, Patricia Handy, Kathleen Lesko, Eileen McClay, Betty Pasta, Marjorie Pinsky, Sol Schindler, Mary Talley

Bachelor of Arts with a major in American Literature (Field-of-Study or *Departmental).*—Prerequisite: the Arts and Letters curriculum, page 76.

Requirements for the *Field-of-Study major:* the general requirements, pages 81–85, and the passing of the American Literature major examination at the end of the senior year. The field of coordinated knowledge upon which the student will be examined at the end of his senior year includes both American and English literature, but with an emphasis on American literature (the history of the literature; the chief writers; and a reasonable acquaintance with the social, political, and intellectual backgrounds). A proseminar, Engl 199–200, assists students in preparing for the major examination. A maximum of 6 semester hours of second-group composition courses (Engl 101, 102, 103, 105–6, 107, and 108) may be applied toward a degree by Field-of-Study majors in American Literature. A detailed description of the major is available in the Office of the Dean of Columbian College of Arts and Sciences. A Senior Honors Program is open to qualified students. A pamphlet describing the Program is available at the Department of English.

Requirements for the *Departmental major:* the general requirements, pages 81–85, including 36 semester hours of second-group courses offered by the Department of English, of which at least 24 (including Engl 161–62) must be in American literature and 6 in English literature. A maximum of 6 semester hours of second-group composition courses (Engl 101, 102, 103, 105–6, and 108) may be applied toward a degree by Departmental majors in American Literature. Each student is expected to develop his program in consultation with his adviser.

Bachelor of Arts with a major in English Literature (Field-of-Study or *Departmental).*—Prerequisite: the Arts and Letters curriculum, page 76.

Requirements for the *Field-of-Study major:* the general requirements, pages 81–85, and the passing of the English Literature major examination at the end of the senior year. The field of coordinated knowledge upon which the student will be examined at the end of his senior year includes both English and American literature, but with an emphasis on English literature (the history of the literature; the chief writers; and a reasonable acquaintance with the social, political, and intellectual backgrounds). A proseminar, Engl 159–60, assists students in preparing for the major examination. A maximum of 6 semester hours of second-group composition courses (Engl 101, 102, 103, 105–6, 107, and 108) may be applied toward a degree by Field-of-Study majors in English Literature. A detailed description of the major is available in the Office of the Dean of Columbian College of Arts and Sciences. A Senior Honors Program is open to qualified students. A pamphlet describing the Program is available at the Department of English.

Requirements for the *Departmental major:* the general requirements, pages 81–85, including 30 to 36 semester hours of second-group courses offered by the Department of English. These courses must include Engl 121 or 122; 3 semester hours in each category of study in English literature—periods, genres, major authors; and 3 semester hours in American literature. A maximum of 9 semester hours of second-group composition courses (Engl 101, 102, 103, 105–6, 107, and 108) may be applied toward a degree by Departmental majors in English Literature. Each student is expected to develop his program in consultation with his adviser.

Master of Arts in the field of American Literature.—Prerequisite: the degree of Bachelor of Arts with an undergraduate major in English, or 24 semester hours in English and/or American literature above the sophomore level.

Required: the general requirements, pages 90–96, including (1) 24 semester hours of course work planned in consultation with the adviser on the basis of the student's undergraduate preparation, including a minimum of 6 semester hours in English literature; (2) a written Master's Comprehensive Examination; (3) a Master's thesis (6 semester hours) written on an approved topic under the direction of the instructor in whose field the major portion of the material falls, or, with the approval of the Department adviser, 12 additional semester hours in lieu of thesis.

Master of Arts in the field of English Literature.—Prerequisite: the degree of Bachelor of Arts with an undergraduate major in English or American Literature at this University, or 24 semester hours in English and/or American literature above the sophomore level.

Required: the general requirements, pages 90–96, including (1) 24 semester hours of course work, planned in consultation with the adviser; (2) a written Master's Comprehensive Examination; and (3) a Master's thesis (6 semester hours) written on an approved topic under the direction of the instructor in whose field the material falls, or, with the approval of the Department adviser, 12 additional semester hours in lieu of thesis.

Doctor of Philosophy in the field of American Literature.—Required: the general requirements, pages 90–94, 96–98; the passing of a General Examination in four of the six following fields: (1) Early American Literature—to 1815, (2) American Fiction, (3) American Poetry, (4) American Romanticism, (5) American Realism, (6) English Literature—one of the first seven fields listed below under "Doctor of Philosophy in the field of English Literature." Each student plans his program in consultation with a departmental committee.

Doctor of Philosophy in the field of English Literature.—Required: the general requirements, pages 90–94, 96–98, including the passing of a General Examination in four of the eight following fields: (1) Beginnings to 1500, Linguistics, and History of the Language; (2) 1500–1660; (3) 1660–1800; (4) 1800–1900; (5) 1900 to Present; (6) Drama, including Shakespeare; (7) Criticism; (8) American Literature—one of the first five fields listed above under "Doctor of Philosophy in the field of American Literature." Each student plans his program in consultation with a departmental committee.

Bachelor of Arts in Education with a teaching field in English.—Prerequisite: the Education curriculum, pages 78–79.

Required: the English option and the professional courses listed on pages 108–9, 115.

Students whose College Board English Composition Achievement Test scores suggest inadequate preparation may be assigned to Engl 1*x* or may be tested in vocabulary, spelling, grammar, standard usage, and writing skill, before placement in either Engl 1*x* or 1. Students whose scores indicate marked superiority will be allowed to waive the Engl 1 requirement.

All students enrolled in curricula leading to Bachelor's degrees in Columbian College (who are required to take one year of English composition and one year of literature in English, Classics, French, German, Italian, Slavic, or Spanish) will follow the sequence of Engl 1 or 1*x*, both semesters of one of the introductory literature courses, and Engl 40.

Engl 2 is the second half of the 6-hour composition requirement of students *not* required to follow the Columbian College of Arts and Sciences sequence.

Departmental prerequisite: Engl 1 or 1*x* is prerequisite to all other courses in English. One of the following 6-hour courses—Engl 51–52, 71–72, or 91–92; Clas 71, 72; Fren 51–52; Germ 51–52; Ital 51–52; Slav 91–92; or Span 51–52—is prerequisite to all second-group courses in English except Engl 115 and Engl 161–62.

ENGLISH COMPOSITION

FIRST GROUP

A **English for Foreign Students** (3) — Wright and Staff

Reading and writing to assist the foreign student in overcoming deficiencies in the use of English. Special attention to spelling, syntax, grammar, idiom, and vocabulary. (Fall and spring—evening)

B **English for Foreign Students** (3) — Wright and Staff

For second-semester foreign students not ready for Engl 1. Writing of expository paragraphs and themes; outlining; reading for comprehension, vocabulary, and style. (Fall and spring—evening)

1 **English Composition** (3) — Moore and Staff

Analysis and practice of expository techniques with emphasis on unity, development, organization, and coherence; library research procedure. (Fall and spring—day and evening)

1*x* **English Composition** (3) — Moore and Staff

Intensive course in English grammar and composition for students inadequately prepared for Engl 1. Begins with detailed instruction, drill, and exercises in basic structure of the English language and in writing paragraphs; continues with content of Engl 1. Engl 1*x* meets five hours a week and carries 3 semester hours of credit. Total fee, $247 (tuition fee of $222 plus additional fee of $25). (Fall—day and evening; spring—evening)

2 **English Composition** (3) — Moore and Staff

For second-semester freshmen not following Columbian College sequence. Readings and practice in expository and argumentative techniques; research practice. Credit not given to students with credit for Engl 40. Prerequisite: Engl 1 or 1*x*. (Fall—day; spring—day and evening)

40 **English Composition** (3) Moore and Staff

Second half of the 6-hour English Composition course required of Columbian College students. Critical analysis and practice in expository and argumentative techniques; research practice. Credit not given to students with credit for Engl 2. Prerequisite: Engl 1 or 1x and both semesters of one of the introductory literature courses. (Fall and spring—day and evening)

SECOND GROUP

101 **Expository Writing** (3) McClanahan, Moore

Types of expository writing; weekly exercises based on students' needs; particular attention may be given to problems in the writing of graduate theses. Prerequisite: Engl 1 or 1x; 2 or 40. (Fall—day)

102 **Narrative Writing** (3) Weismiller, Claeyssens

Techniques of narrative writing; class criticism of student writing. Prerequisite: Engl 1 or 1x; 2 or 40; consent of instructor. To apply for the instructor's consent a student should, before registration, submit samples of his writing. (Fall—evening; spring—day)

103 **The Writing of Fiction—the Short Story** (3) Claeyssens

Prerequisite: Engl 102, consent of instructor. To apply for the instructor's consent a student should, before registration, submit a sample of his writing.

105–6 **The Writing of Plays** (3–3) Claeyssens

Prerequisite: Engl 1 or 1x; 2 or 40; consent of instructor. To apply for the instructor's consent a student should, before registration, submit a sample of his writing. (Academic year—evening)

107 **The Writing of Fiction—the Novel** (3) Claeyssens

Prerequisite: Engl 102 or 103, consent of instructor. To apply for the instructor's consent a student should, before registration, submit a sample of his writing.

108 **Advanced Writing—Poetry and Prose** (3) Weismiller

(Formerly The Writing of Poetry)

Prerequisite: Engl 1 or 1x; 2 or 40; consent of instructor. To apply for the instructor's consent a student should, before registration, submit a sample of his writing. (Fall—day)

ENGLISH LITERATURE

FIRST GROUP

51–52 **Introduction to English Literature** (3–3) Weismiller and Staff

Historical survey. Prerequisite: Engl 1 or 1x. (Engl 51: fall—day and evening; spring—day. Engl 52: fall—day; spring—day and evening.)

91–92 **Introduction to European Literature** (3–3) Crane and Staff

Consideration of various types. Prerequisite: Engl 1 or 1x. (Engl 91 and 92: fall and spring—day)

SECOND GROUP

111 **Medieval English Literature—Exclusive of Chaucer** (3) Allee

112 **Chaucer** (3) Allee
(Spring—day)

115 **Introduction to English Linguistics** (3) Allee
Development of the English language in a historical treatment of English grammar. (Fall—day)

116 **Medieval Legend and Saga** (3) Allee
Celtic and Norse.

117 **English Poetry: Form and Content** (3) Weismiller
Medieval period to the 20th century. (Fall—day)

121 **History of English Literature** (3) Reesing
(Fall—day)

122 **Practical Criticism** (3) Weismiller
(Spring—day)

123 **Principles of Literary Criticism** (3)

125–26 **Elizabethan Verse and Prose** (3–3) Quitslund
Engl 125: survey of nondramatic literature. Engl 126: detailed study of major writers and genres.

127–28 **Shakespeare** (3–3) Highfill, Crane
(Academic year—day)

129 **The Earlier 17th Century** (3) Reesing, Linton
Poetry and prose to 1660, exclusive of Milton. (Fall—day)

130 **Milton** (3) Reesing, Linton, Weismiller
(Spring—day)

131–32 **English Literature, 1660–1780** (3–3) Highfill
Poetry and prose of the Neoclassic period. Engl 131: 1660–1740. Engl 132: 1740–1780. (Engl 132: fall—day)

133–34 **The Romantic Movement** (3–3) Plotz
Engl 133: survey of poetry and prose, 1780–1830. Engl 134: detailed study of major writers and genres. (Academic year—day)

135–36 **Victorian Literature** (3–3) Claiborne
Engl 135: survey of poetry and prose, 1830–1900. Engl 136: detailed study of major writers and genres. (Academic year—day)

137–38 **The 20th Century** (3–3) Linton, Weismiller
British poetry, prose, and drama since 1900. (Academic year—day)

152 **Introduction to Contemporary Poetry** (3)
Study of works by representative contemporary poets, with particular attention to the mythic tradition in poetry.

153–54 **The English Novel** (3–3) Claiborne
Major novelists, 18th and 19th centuries. (Academic year—evening)

155–56 **The English Drama** (3–3) Highfill, Crane
Engl 155: principally the drama of Shakespeare's contemporaries. Engl 156: historical survey, 1660 to present. (Academic year—day)

159–60 **Proseminar in English Literature** (3–3) Reesing, Weismiller, and Staff
For field-of-study majors in English Literature. Readings, conferences, and group discussions. (Academic year—day)

198 **Senior Honors Thesis** (3) Weismiller and Staff
An independent-study course in which, under the guidance of an instructor, the student writes a thesis on an approved topic. Open to qualified seniors in the field-of-study major in English Literature. (Fall and spring)

THIRD GROUP

212 **Studies in Chaucer** (3) Allee

213–14 **Old English** (3–3) Allee
English language and literature before 1100. Engl 213: Old English grammar and readings. Engl 214: *Beowulf*.

217 **English Poetry: the Formal Development** (3) Weismiller

218 **Form and Content in Modern Poetry** (3) Weismiller

219 **Research Methods and Bibliographical Materials** (3) Broderick
To acquaint graduate students with the principal sources of bibliography and the typical problems in research. (Fall—evening)

220 **Studies in Modern Dramatic Literature** (3) Crane

221 **Studies in Comic Literature** (3) Crane

223–24 **Studies in Literary Criticism** (3–3) Slattery
(Academic year—evening)

225–26 **Studies in 16th Century English Literature** (3–3) Quitslund

227–28 **Studies in Shakespeare and His Contemporaries** (3–3) Crane
(Academic year—evening)

229 **Studies in English Literature 1600–1660** (3) Reesing
Chief figures exclusive of Milton.

230 **Studies in Milton** (3) Reesing

231–32 **Studies in English Literature, 1660–1780** (3–3) Highfill

233–34 **Studies in the Romantic Movement** (3–3) Plotz
(Academic year—day)

235–36 **Studies in Victorian Literature** (3–3)

237–38 **Studies in 20th Century Literature** (3–3) Linton
(Engl 237: fall—day)

242 **Renaissance Intellectual History** (3) Linton
Offered in collaboration with the Folger Shakespeare Library Institute of Renaissance and 18th Century Studies.

253–54 **Seminar: the English Novel** (3–3) Coberly

255–56 **Studies in Dramatic and Theatrical History** (3–3) Highfill
Engl 256: seminar in Restoration and the 18th Century Theater held among the Folger Library collections. (Engl 256: spring—day)

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

AMERICAN LITERATURE

FIRST GROUP

71–72 **Introduction to American Literature** (3–3) Cole and Staff
Historical survey. Engl 71: from beginnings to the Civil War. Engl 72: from the Civil War to present. Prerequisite: Engl 1 or 1x. (Engl 71 and 72: fall and spring—day and evening)

SECOND GROUP

161–62 **Studies in American Literature** (3–3) McCandlish, Sten
Same as AmCv 161–62. Major factors in the national cultural tradition as shown by outstanding writers. Prerequisite: Engl 51–52 or 71–72. (Academic year—day and evening)

163–64 **Major American Poets** (3–3) Ganz
Advanced critical study of significant writers and movements. Engl 163: from beginnings through the 19th century. Engl 164: the 20th century. (Academic year—day)

165–66 **American Drama** (3–3) Cole, Claeyssens, Scanlan
Historical and critical study of significant plays and forms. Engl 165: from beginnings to 1930. Engl 166: since 1930. (Academic year—day)

167–68 **The American Novel** (3–3) Coberly
Historical and critical study of significant novels. Engl 167: from beginnings through the 19th century. Engl 168: 20th century. (Academic year—evening)

170 **The American Short Story** (3) Coberly
Historical development of the short story in America.

171–72 **Major American Writers** (3–3) Claeyssens
(Academic year—day)

173–74 **Selected Literary Movements** (3–3)

175–76 **Special Topics in American Literature** (3–3) Green
Topic for 1971–72: autobiography as literature. A broad survey on the varieties of autobiographical work in American Literature, from Colonial times to the present. (Academic year—day)

177–78 **Contemporary American Literature** (3–3) Ganz, Claeyssens
(Academic year—day)

199–200 **Proseminar in American Literature** (3–3) Ganz, Scanlan, and Staff
For field-of-study majors in American Literature. Readings, conferences, and group discussions. (Academic year—day and evening)

198 **Senior Honors Thesis** (3) Weismiller and Staff
An independent-study course in which, under the guidance of an instructor, the student writes a thesis on an approved topic. Open to qualified seniors in the field-of-study major in American Literature. (Fall and spring)

THIRD GROUP

219 **Research Methods and Bibliographical Materials** (3) Broderick
To acquaint graduate students with the principal sources of bibliography and the typical problems in research. (Fall—evening)

263–64 **Studies in American Poetry** (3–3) Ganz
(Academic year—day)

267–68 **Seminar: American Fiction** (3–3) Coberly
Research and critical reading: fiction and the criticism of fiction. Engl 267: Henry James. Engl 268: Faulkner. (Academic year—evening)

270 **Seminar: the American Short Story** (3) Coberly

281–82 **Seminar: Early American Literature** (3–3) McCandlish
(Formerly Seminar: American Colonial Literature)
Same as AmCv 281–82. (Academic year—day)

283 **Studies in American Transcendentalism** (3) Broderick
(Spring—evening)

284 **Seminar: American Literature, 1865–1900** (3) McCandlish
Intensive study of works of Twain, Howells, Henry James, Norris, and Stephen Crane.

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

FOURTH GROUP

367–68 **Readings in American Fiction** (3–3) Coberly

For graduate students only. Literature and the critical materials for which graduate students are responsible on the Doctor of Philosophy general examination.

381–82 **Readings in American Colonial Literature** (3–3) McCandlish

Same as AmCv 381–82. For students preparing for the Doctor of Philosophy general examination.

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Epidemiology and Environmental Health

Professors J.W. Millar *(Chairman)*, J.A. Halsted *(International Health)*
Associate Professor C.R. Hartman
Associate Clinical Professors W.J. Zukel, L.S. Jaffe
Assistant Professors E.N. Kassira, Yousef Al-Doory, F.L. Hurley
Assistant Clinical Professors Lawrence Pyle, Jr., John Vinyard, Jr.
Assistant Professorial Lecturers S.H. Barboo, Jr., C.H. Miller, N.E. Manos, J.A. Lee

Master of Science in the field of Mycology.—An interdepartmental degree offered by the departments of Biochemistry, Epidemiology and Environmental Health, and Microbiology.

Prerequisite: a Bachelor's degree with a major in Biology, Botany, Chemistry, or Zoology, from this University, or an equivalent degree. The undergraduate program should have included the following courses, or equivalent: B Sc 11–12; Chem 11–12, 51–52, 53–54.

Required: the general requirements, pages 90–96. Candidates must complete either (1) a minimum of 33 semester hours including Epid 299–300 *Thesis Research*, or (2) a minimum of 39 semester hours without a thesis. The required courses in this program are Bioc 221–22; Epid 201, 217, 230 (2 semester hours); Micr 201, 225, 231.

Doctor of Philosophy field of study in Human Ecology.—See pages 90–94, 96–98, for requirements for the degree.

201 **Introduction to Epidemiology and Environmental Health** (2) Millar and Staff

Required for medical students; open to qualified graduate students. Principles and methodology of epidemiology and biostatistics. Ecological approach to health and disease, including parasitology and mycology. (Spring—day)

217 **Advanced Mycology** (4) Al-Doory

Advanced study of fungi. Prerequisite: Micr 201 or equivalent. (Fall —day)

218 **Advanced Parasitology** (1 or 2) Millar

For medical students; open to qualified graduate students. Study of host-parasite relationships, including laboratory procedures. (Fall—day)

219 **Malariology** (1) Kassira and Staff

The general principles of the diagnosis, life cycle, pathogenicity, treatment, and prevention of malaria. Prerequisite: Epid 201 or equivalent. (Fall—day)

230 **Biostatistics** (2 to 4) Hurley, Manos

Introduction to statistical analysis, the theory of measurements and distribution, including significance testing, basic concepts of probability and association, sampling techniques and the design of experiments, introduction to computers. (Fall and spring—day)

295 **Research in Epidemiology** (arr.) Staff

Participation in experimental studies in infectious diseases and research in community medicine. Admission by permission of Department. (Fall and spring) Staff

299–300 **Thesis Research** (3–3)

(Fall and spring) Staff

301 **Epidemiology and Environmental Health** (1) Staff

Lectures and seminars. Emphasis on means of organizing community to provide epidemiological solutions to health problems, developing an awareness of health resources and significant socioeconomic considerations in bringing total health to the community, showing importance of health as related to individual citizens. World health problems. Prerequisite: Micr 201 or equivalent. (Spring—day)

351 **Global Epidemiology** (1) Staff

For medical students; open to graduate students by arrangement. Geographic pathology of disease and international aspects of disease prevention and control, including world demographic problems. (Fall—day)

352 **Seminar: Experimental Epidemiology** (2) Staff

For medical students; open to graduate students by arrangement. Student participation in definitions, design, and methods for developing epidemiologic studies of diseases. Coordinated so that protocol developed can be applied to field use. (Fall—day) Millar

353 **Military Preventive Medicine** (1)

Operational medicine, environmental and sanitation problems, epidemiologic diseases of military importance and their prevention and control. Medical aspects of aerospace and submarine medicine. (Fall—day) Lee and Staff

354 **Seminar: Human Ecology** (1)

Ecology—man within the framework of reference—physical and cultural anthropology, geography, sociology, urban planning, public health, and public administration. (Fall—day) Staff

398 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research (arr.)** **Staff**

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Forensic Science—Graduate Study

COMMITTEE ON FORENSIC SCIENCE

T.P. Perros *(Chairman)*, A.H. Desmond, H.H. Hobbs, R.L. Holland, J.E. Starrs

The Graduate School of Arts and Sciences offers an interdisciplinary program leading to the degree of Master of Science in Forensic Science. The program is directed by a committee whose members are drawn from the departments of Biological Sciences, Chemistry, and Physics, and from the School of Government and Business Administration and the National Law Center. The student will work closely with the Committee on Forensic Science in setting up a program that meets his interests, needs, and background knowledge. Inquiries and applications should be addressed to the Graduate School of Arts and Sciences.

Master of Science in Forensic Science.—Prerequisite: a Bachelor's degree with a major in mathematics, or in the biological, engineering, or physical sciences.

Required: the general requirements, pages 90–96. The program of study consists of 36 semester hours of approved graduate-level courses with or without a thesis (equivalent to 6 semester hours). All candidates are required to pass a Master's Comprehensive Examination. If a candidate elects a thesis, the thesis work is directed by one of the participating departments in the Forensic Science program. There is no tool requirement.

The program of studies must include the following courses: ForS 201, 202, 205 or 207, 206 or 208, 209, and Mgt 218. In addition, 6 semester hours of graduate-level course work in the biological or natural sciences are to be selected with the approval of the adviser. The remaining semester hours of course work must be selected from approved courses in the areas of science, law, and management science; however, the student may select subjects from only two of the three areas.

FORENSIC SCIENCE

201 **Forensic Science in Law Enforcement I: Serology, Microscopy, Mineralogy** (3) **Staff**

Principles in forensic serology; theories and principles of immunohematology, serology, biochemistry, and microscopic comparative study of human and animal reproductive cells. Theories and principles of the microscopic and microchemical study of textile fibers and fabrics; micromorphological studies of human and nonhuman hairs, selected examination of unidentified human remains. Theories and principles of mineralogy, petrography, optics, ceramics, and microscopic and instrumental comparisons of material of a mineral nature. (Fall—evening)

202 **Forensic Science in Law Enforcement II: Metallurgy—Intrumental Analysis** (3) **Staff**

Theories and principles of mechanical, chemical, and thermal behavior of metals and alloys; metal failure and fracture analysis; metallography and compositional chemical analyses of metals and alloys. Theories and principles of instrumental analysis, including emission spectrography, X-ray spectrography and diffractometry, infrared, and ultraviolet methods of identification and analysis. (Spring—evening)

203 **Forensic Science in Law Enforcement III: Examination of Questioned Documents** (3) Staff

Theory and principles of handwriting and handprinting, duplicating processes, paper manufacture, and fiber analysis; chemical, radiological, and chromatographic studies of paper; determination of age of documents, neutron activation, and other related methods of examination of questioned documents. (Fall—evening)

205 **Advanced Criminal Evidence** (3) Staff

An in-depth study of procedural rules affecting the collection, accessibility, and use of physical evidence. Considerable attention will be given to court opinions defining the rules of search and seizure; but other matters of current relevance will also be included such as the judicial concern over prejudicial publicity of crime news, the rules relating to the disclosure of physical evidence to the defense, and the identification and custody by law enforcement agencies of evidentiary matter.

206 **The Scientist as an Expert Witness** (3) Staff

The qualifications and preparation of an expert witness and the relationships and responsibilities of the expert in court in criminal and civil cases. The history of expert testimony in court systems. Emphasis on current acceptance and limitations governing use of expert witnesses in criminal and civil cases.

*207 **Advanced Criminal Procedure** (3) Starrs, Robinson, Ferster

Decision to arrest, prosecutive discretion, bail, the preliminary hearing, right to a speedy trial, discovery, plea bargaining, publicity, post-conviction procedures. (Fall—day and evening)

†208 **Administration of Criminal Justice** (3) Allen

Consideration and analysis of selected advanced problems in the administration of criminal justice. The subject matter covered will vary from year to year, with concentration in areas of current interest and dynamic change (e.g., right to counsel, arrest and interrogation, search and seizure, prejudicial publicity, discovery, electronic interception, mental impairment). Emphasis will be placed on the role and professional responsibilities of prosecutor and defense counsel and on developmental trends in the law. (Fall and spring)

‡209 **The Police and the Community** (3) Allen, Courtless

Problems and potential of contemporary urban law enforcement: the role and perspective of the police officer; the police *qua* organization; "styles" of law enforcement; law enforcement in the inner city; relationship with ethnic minorities; civil disorder; police-community relations; methods in arrest and investigation; complaint review procedures; science and technology in law enforcement; police handling of juveniles; crime and crime statistics. (Spring—day)

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* Same as Law 334 (2). Graduate students registering for ForS 207 make special arrangements with the instructor for supplementary assignments equivalent to one additional semester hour. Mr. Starrs, Mr. Robinson, and Mrs. Ferster are Professors of Law in the National Law Center.

† Same as Law 472 (2). Graduate students registering for ForS 208 make special arrangements with the instructor for supplementary assignments equivalent to one additional semester hour. Mr. Allen is Professor of Law in the National Law Center.

‡ Same as Law 477 (2). Graduate students registering for ForS 209 make special arrangements with the instructor for supplementary assignments equivalent to one additional semester hour. Mr. Allen is Professor of Law in the National Law Center.

*210 **Forensic Medicine** (3) Sharpe, Head

A survey of interprofessional relations between physicians and lawyers in the office, the hospital, and the courtroom, with incidental attention to laboratories, legislatures, and administrative agencies. Undergraduate law students and second-year medical students study how their professions accommodate conflicts between economics and ideals, and how they exercise judgment in applying their technical skills. (Fall—day and evening)

211 **Law and Criminology I: Search for the Causes of Criminal Behavior** (3) Courtless

Role which criminological knowledge of crime causation may play in assisting lawyers to appraise the effectiveness of various alternative social and legal devices in controlling deviant behavior. The search for factors related to criminal behavior will be developed historically, with emphasis on current casual theories developed by various disciplines. Model as well as operational penal codes, sentencing and probation practices, and specialized facilities will be analyzed in terms of their relationship to such casual theories. (Same as Law 475 (2)).†

212 **Law and Criminology II: Society's Responses to the Criminal Offender** (3) Courtless

Study of the development and current use of society's three major approaches to the handling of offenders: punitive, mechanical, and correctional. Emphasis on society's changing responses to criminal and delinquent behavior, and research findings concerning effectiveness of these responses. Analysis of treatment strategies to facilitate communication between members of the legal profession and behavior scientists charged with effectuating these strategies. (Same as Law 476 (2)).†

‡213 **Post-conviction Dispositions—Dynamics of the Law of Criminal Corrections** (3) Barkin

Study of the statutes, practice, problems, and potentials of the alternatives facing a defendant including mental fitness to proceed to trial, probation, sentencing, parole, correctional institutions, rights of prisoners. (Fall—evening; spring—day)

§214 **Seminar: Law and Psychiatry** (3) Allen

Designed to (1) expose the lawyer to some of the constructs of dynamic psychiatry dealing with human personality and behavior, and to relate them to problems encountered in legal practice; (2) provide information —both psychiatric and legal—bearing upon such topics as mental illness and tort liability ("traumatic neurosis," malpractice, commission of torts by mentally ill persons); hospitalization of the mentally ill and mentally retarded; guardianship; ad hoc determinations of incompetency (testa-

* Same as Law 390 (2). Graduate students registering for ForS 210 make special arrangements with the instructor for supplementary assignments equivalent to one additional semester hour. Mr. Sharpe is Professor of Law in the National Law Center; Dr. Head is Professor of Medical and Public Affairs in the National Law Center and the School of Medicine.

† Graduate students registering for ForS 211 or 212 make special arrangements with the instructor for supplementary assignments equivalent to one additional semester hour.

‡ Same as Law 478 (2). Graduate students registering for this course make special arrangements with instructor for supplementary assignments equivalent to one additional semester hour. Mr. Barkin is Professorial Lecturer in Law in the National Law Center.

§ Same as Law 486 (2). Graduate students registering for this course make special arrangements with the instructor for supplementary assignments equivalent to one additional semester hour. Mr. Allen is Professor of Law in the National Law Center.

mentary, contractual, and donative capacity; capacity to marry, have custody of children; mental illness as a ground for divorce; eugenic sterilization); mental illness and criminal law (psychiatric evaluations in criminal cases, determinations of competency to stand trial, criminal responsibility); and (3) examine the role of psychiatry in legal settings, including the effective use of the psychiatrist and psychologist as expert witness.

ANATOMY

252 *Physical Anthropology* (1)
256 *Human Genetics* (1)
260 *Electron Microscopy in Cellular Biology—Lecture* (1)
261 *Electron Microscopy in Cellular Biology—Laboratory* (2)

BIOCHEMISTRY

221–22 *General Biochemistry* (4–4)

BIOLOGICAL SCIENCES

BIOLOGY

111 *Introductory Microbiology* (4)
115 *Cytology* (4)
119 *Cell Biochemistry* (4)
120 *Cell Physiology* (4)
127 *Genetics* (4)

ZOOLOGY

104 *Comparative Vertebrate Anatomy* (4)
148 *Histology* (4)
164 *Vertebrate Physiology* (4)
245 *Histochemistry* (3)

CHEMISTRY

111–12 *Physical Chemistry* (3–3)
113–14 *Physicochemical Measurements* (2–2)
122 *Instrumental Analysis Lectures* (2)
134 *Descriptive Inorganic Chemistry* (2)
219 *Spectrochemistry* (3)
221 *Advanced Analytical Chemistry I* (3)
222 *Advanced Analytical Chemistry II* (2 or 3)
235–36 *Advanced Inorganic Chemistry* (3–3)

MANAGEMENT SCIENCE

201 *Advanced Administrative Management* (3)
204 *Quantitative Factors in Administration* (3)
207 *Human Behavior in Organizations* (3)
218 *Survey of Data Processing* (3)

MICROBIOLOGY

231 *Cellular Immunology* (2)
257 *Experimental Immunochemistry* (3)

PATHOLOGY

201 *Pathology* (8)
295 *Comparative Pathology III* (5 to 30)

PHARMACOLOGY

201 *Pharmacology* (8)
272 *Physiological Disposition of Drugs* (3)

PHYSICS

167 *Principles of Quantum Physics* (3)
168 *Applied Quantum Physics* (3)
170 *Elementary Solid State Physics* (3)
175 *Nuclear Physics* (3)
231 *Electromagnetic Theory: Macroscopic Effects* (3)
232 *Advanced Mechanics* (3)
233–34 *Quantum Mechanics* (3–3)
236 *Electromagnetic Theory: Electrodynamics and Radiative Effects* (3)
241 *Statistical Mechanics* (3)
243 *Solid State Physics: Structure and Binding* (3)
244 *Solid State Physics: Electronic Processes in Metals* (3)
247 *Nuclear Theory* (3)
249 *Statistical Processes* (3)
251–52 *Laboratory* (3–3)

GW-Washington Project

Professor C.C. Mondale
Special Lecturer R.S. French

EXPERIMENTAL HUMANITIES

FIRST GROUP

51 **Individuality in the Urban Community** (3) French, Holmstrom

Study of the meaning of individuality under urban conditions, in the American past and present, as revealed in the arts and in literature, and as implicit in the scientific study of the individual and the small group. Individual and/or group projects on topics of most concern to students. Admission by permission of instructor. **(Fall—day)**

52 **Urban Goals and Agents of Change** (3) French, Holmstrom

Study of the meaning of community under urban conditions, in the American past and present; of goals for the "good" community; and of agencies

of change. Individual and/or group projects examining means for the realization of particular goals, with special reference to the Washington metropolitan area. Prerequisite: Hum 51. Admission by permission of instructor. (Spring—day)

SECOND GROUP

101 **Supervised Work-Study I** (6)
Individual student projects involving work with a community agency and a field-study project supervised by an appropriate faculty member. Admission by permission of instructor. (Fall and spring)

102 **Supervised Work-Study II** (6) Mondale, French
Continuation of work commitment and study project undertaken in Hum 101. Prerequisite: Hum 101. Admission by permission of instructor. (Fall and spring)

*196 **Urban Ecology Workshop** (4)
Legal, scientific, political, and ethical aspects of specific environmental issues in the Washington metropolitan area.

Genetics—Graduate Study

COMMITTEE ON GENETICS

S.O. Schiff *(Chairman)*, W.F. Anderson, C.M. Berlin, Jr., V.H. Cohn, Jr., Rosalie De Giovanni-Donnelly, C.B. Jacobson, M.S. Legator, W.G. Nash, I.R. Telford

The Graduate School of Arts and Sciences offers an interdepartmental program leading to the degrees of Master of Science and Doctor of Philosophy in the field of Genetics. This program is directed by a Committee whose members are drawn from the departments of Anatomy, Biochemistry, Biological Sciences, Microbiology, Obstetrics and Gynecology, Pediatrics, and Pharmacology.

A baccalaureate degree is required for admission to the degree program. The undergraduate program must have included the following: 8 semester hours each in biology, inorganic chemistry, organic chemistry, and physics; and 6 semester hours of English composition and literature. While not required for admission, courses in embryology, histology, genetics, and mathematics are strongly recommended.

Master of Science in the field of Genetics.—Required: the general requirements, pages 90–96. The 30 semester hours required in this program must include Gnet 201–2 and Gnet 299–300. The remaining 20 semester hours of course work are to be selected, with the approval of the Committee on Genetics, from the departmental courses listed below.

Doctor of Philosophy in the field of Genetics.—Required: the general requirements, pages 90–94, 96–98. The program of study must include Gnet 301–2, 8 to 10 semester hours of biochemistry, 8 to 10 semester hours of cell biology, 10 to 12 semester hours of genetics, and 2 or 3 semester hours of statistics. These courses may be selected from the departmental listings on pages 281–82.

* Offered jointly by the GW-Washington Project and the Department of Education. Hum 196 does not have a laboratory session, therefore students receive a maximum of 4 semester hours of credit for this course. Educ 196 has a laboratory session on curricular materials for elementary and secondary school teachers, therefore teachers receive 2 additional hours of credit for a total of 6 semester hours for this course.

GENETICS

THIRD GROUP

201–2 **Advanced Problems in Genetics** (2–2) **Staff**

Individual study with each member of the Committee on Genetics. Required of all Master's degree candidates in the field of Genetics. (Academic year)

295 **Research** (arr.) **Staff**

Open to qualified Master's degree students. Research on problems approved by the Committee on Genetics. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) **Staff**

(Academic year)

FOURTH GROUP

301–2 **Advanced Problems in Genetics** (2–2) **Staff**

Individual study with each member of the Committee on Genetics. Required of all students preparing for the Doctor of Philosophy general examination whose field of study is Genetics. (Academic year)

398 **Advanced Reading and Research** (arr.) **Staff**

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

ANATOMY

203 *Human Embryology* (1)
256 *Human Genetics* (1)
260 *Electron Microscopy in Cellular Biology—Lecture* (1)
261 *Electron Microscopy in Cellular Biology—Laboratory* (2)

BIOCHEMISTRY

221–22 *General Biochemistry* (4–4)
224 *Biochemistry of Enzymes* (1)
227 *Biochemistry Seminar* (1)
258 *Inherited Metabolic Diseases* (1)
266 *Biochemical Genetics* (1)

BIOLOGICAL SCIENCES

BIOLOGY

108 *Organic Evolution* (3)
115 *Cytology* (4)
118 *Advanced Cytology* (3)
119 *Cell Biochemistry* (4)

127 *Genetics* (4)
138 *Advanced Genetics* (3)
167 *Radiation Biology* (3)
206 *Seminar: Radiation Biology* (3)
207 *Seminar: Origin of Life* (3)
227 *Seminar: Genetics* (3)

ZOOLOGY

145 *Introduction to Vertebrate Embryology* (3)

EPIDEMIOLOGY AND ENVIRONMENTAL HEALTH

230 *Biostatistics* (2 to 4)

MICROBIOLOGY

258 *Microbial Genetics* (2)

OBSTETRICS AND GYNECOLOGY*

391 *Cytogenetics* (1)
392 *Reproductive Genetics* (1)
395 *Gametogenesis* (1)
399 *Medical Genetics* (1)

PHARMACOLOGY

256 *Molecular Pharmacology* (2)

PHYSIOLOGY

201 *Physiology* (8)
273 *Investigative Electron Microscopy* (2)

STATISTICS

91 *Principles of Statistical Methods* (3)
117 *Analysis of Variance* (3)

Geography and Regional Science

Associate Professor Marvin Gordon *(Chairman)*
Assistant Professors Subramaniam Moryadas, J.C. Lowe, E.O. Pederson

Bachelor of Arts with a major in Geography (Departmental).—Prerequisite: the Arts and Letters curriculum, page 76, including Geog 51, 52; Geol 1; and an introductory course in Statistics.

Required: in addition to the general requirements, pages 81–85, 27 semester hours of Geography beyond first-group courses.

* See the School of Medicine catalogue.

Master of Arts in the field of Geography.—Prerequisite: a Bachelor of Arts degree with a major in Geography from this University, or an equivalent degree.

Required: the general requirements, pages 90–96. The minimum requirement consists of 24 semester hours of approved course work plus a thesis (equivalent to 6 semester hours). With the approval of the Department, a student may elect a program of study consisting of 36 semester hours of approved course work without a thesis. A Master's Comprehensive Examination in three fields is required. Candidates must fulfill the tool requirement by either passing a reading knowledge examination in one foreign language or satisfactorily completing the tool requirement in Statistics.

Bachelor of Arts in Education with a teaching field in Geography.—Prerequisite: the Education curriculum, pages 78–79.

Required: the Geography option and the professional courses listed on pages 110, 115.

Master of Arts in Education with a field in Classroom Teaching (specialization in Geography).—Prerequisite: a Bachelor's degree with sufficient concentration in Geography to permit successful pursuit of graduate study in the Department of Geography and Regional Science. Candidates must be accepted by both the School of Education and the Department of Geography and Regional Science.

Required: the general requirements, pages 117–20, including 15 semester hours of graduate courses in Geography.

FIRST GROUP

51 **Introduction to Geography** (3) **Staff**

General survey of the various systematic, physical, and human fields of geography which play a role in the analysis and interpretation of man-environment relationships in both spatial and ecological contexts. (Fall and spring—day)

52 **World Regional Patterns** (3) **Pederson**

Emphasis on spatial aspects of man's activities within a world regional framework. (Spring—day)

SECOND GROUP

103 **Cartography and Graphics** (3) **Staff**

Principles of cartography; emphasis on design and presentation of spatial data. Map projections, field surveying, use of air photographs, and map interpretation. Problems in thematic mapping, including mapping single and multiple distributions as well as movement. Laboratory fee, $15.

104 **Special Techniques in Cartography** (3) **Staff**
(Formerly Quantitative Cartography)

Application of selected descriptive and statistical techniques to the solution of spatial problems. Consideration of spatial measures of central tendency, spatial sampling, measurement of shape, nearest neighbor analysis, quadrat analysis, computer graphics. Laboratory fee, $15.

125 **Transportation Geography** (3) **Lowe**

Problems of interaction, diffusion, and information transfer as they appear in a spatial context. Consideration of nodal activity, nodal and route hierarchies, nature of networks, gravity and interaction models, diffusion process, network geometry. (Fall—day)

126 **Economic Geography** (3) Moryadas
(Formerly World Economic Geography)
Development, elaboration, and testing of theories and hypotheses concerning the location of economic activities: services, manufacturing industries, and agricultural production. Introduction to restatements of classical location theory and new approaches in the empirical analysis of the location of economic activities. Problem-solving exercises, using the University Computer Center's canned programs. (Spring—day)

127 **World Population and Settlement** (3) Gordon
Patterns of world population; factors contributing to population pressures, growth, and migrations.

132 **Resources and Environment** (3)
(Formerly Natural Resources)
Analysis of the spatial pattern of natural resource utilization; emphasis on problems of unequal resource distribution, environmental pollution, ecological imbalance caused by resource misuse, and public policy implications of the distribution of resources over the earth's surface. (Spring—day)

133 **Geography of Poverty and Hunger** (3) Moryadas
Consideration of the spatial distribution of poverty and hunger; emphasis on the United States and South Asia. Topics to be explored include correlates of poverty as race, education, housing, prejudice, land tenure, regional food budgets, geography of food taboos, and government programs concerned with elimination of poverty and hunger. (1971–72 and alternate years: fall—day)

134 **Location of Industry** (3) Moryadas
Introduction to industrial location theory and the major testable hypotheses that can be generated from theory. Empirical examination of the location pattern of selected major industries. Techniques of locational analysis, including comparative cost and input-output analysis leading to the selection of optional locations for industries. Analysis of industrial location factors in the real world. (1972–73 and alternate years: fall—day)

141 **Urban Settlement** (3) Pederson
Consideration of city sizes; functions and locations within a system of cities; emphasis on the physical and functional internal structure of the city, including residential, commercial, and industrial patterns. Analysis of the changing nature of cities and resulting urban problems. (Fall —evening; spring—day)

142 **Urban Environments and Systems** (3) Lowe
Consideration of the interrelationships among (1) urban physical environments, (2) urban service systems, (3) urban social environments, and (4) behavioral aspects of urban life. Topics include microclimatology, site characteristics, water and power delivery systems, police systems, health care delivery systems, environmental health, urban density considerations, perception of urban environments, action space, and social space. (Spring—day)

144 **Environmental Adaptation** (3) Lowe
Basic considerations of the man-environment relationship; emphasis on bioclimatological responses, disease ecology, nutritional demands, land

capabilities, creation of micro-environments, environmental perceptual processes, and diffusion processes. (1972–73 and alternate years: spring—day)

145 **Cultural Geography** (3) Staff

Analysis of the relationships between culture and environment; emphasis on spatial and ecological considerations.

146 **World Political Geography** (3) Gordon

Analysis of the interrelationships between the political community and the human and physical environment. (Fall and spring—day)

153 **Europe** (3) Gordon

Survey of the cultural and physical regional patterns of both Western and Eastern Europe.

161 **Latin America** (3) Gordon

Study of the relationships among the areal distribution of population, economic activity, and physical endowment in Latin America. (Fall—day)

172 **Historical Geography** (3) Pederson

Study of changing attitudes toward the environment and their effects on the human utilization of the earth's surface; emphasis on evolution of settlement patterns and development of communication networks. (1972–73 and alternate years: fall—day)

189–90 **Readings in Geography** (arr.) Staff

(Academic year)

THIRD GROUP

205 **Introduction to Regional Science I** (3) Moryadas

Introduction to major recent developments in spatial analysis. Topics covered are the fitting of probability functions to location patterns, multivariate analysis in geography, locational decision-making, models of spatial change, and numerical methods of regional delimitation. Training in the use of canned programs in the University Computer Center. (Fall—evening)

206 **Introduction to Regional Science II** (3) Moryadas

Detailed consideration of classical industrial location theory, including the works of Weber, Losch, Hoover, and Isard. Recent departures from classical location theory; emphasis on behavioral approaches to studying the location problem.

221 **Seminar: Cultural Geography** (3) Pederson

Study of the noneconomic processes which affect the location of human activity. Topics to be discussed are environmental perception and evaluation, social definitions of space, and diffusion of innovations. (1971–72 and alternate years: fall—evening)

224 **Seminar: Political Geography** (3) Gordon

Study of the spatial relationships between the political community and environment. (1971–72 and alternate years: spring—evening)

243 **Seminar: Urban Geography** (3) Lowe

Functional processes affecting the evolving morphology and internal spatial patterns of urban phenomena; emphasis on economic factors, behavioral considerations, and impact of time. (Spring—evening)

244 **Seminar: Urban Systems** (3) Lowe

(Formerly City Region)

Analysis of the basic concepts of urban hinterland, urban hierarchies, urban economic base, and functional typologies with a view to evaluating the significance of the spatial and temporal properties of central place theory.

265 **Seminar: Geography of the Soviet Union** (3) Baclawski

Physical features, economic geography, natural and energy resources, industries. Soviet transportation system, agriculture, multinational population trends; emphasis on population patterns along borderlands, especially Sino-Soviet border. (Spring—evening)

266 **Seminar: Geography of China** (3) True

Physical and economic geography; emerging industries, energy resources, transportation system. Emphasis on population "explosion"—its distribution and significance—and on regional geography, particularly on the Sino-Soviet border, Manchuria, Tibet, Mongolia, Inner Mongolia, and Sinkiang. (Fall—evening)

287 **Seminar: Problems in Latin American Civilization** (3) Rodríguez

Interdisciplinary seminar guided by a specialist within the methodology of his chosen discipline; each student writes a report on some aspect of a key theme (i.e., Nationalism) in Latin America's experience. Admission by permission of instructor. (Spring—day)

289 **Seminar: Selected Topics I** (3) Lowe

Topic for 1971–72: Diffusion Processes in Geography. Analysis of the spatial and temporal properties of the process of innovation diffusion. Examples selected from tools, ideas, methods, and disease. Consideration given to the influence of distance and behavior, i.e., attitude, social status, and availability of information. An evaluation will be made of selected aspects of the simulation of diffusion. Topic changes each year; may be repeated for credit. (Fall—evening)

290 **Seminar: Selected Topics II** (3) Moryadas

Topic for 1971–72: Electoral Geography. Geographic distribution of voting behavior at a variety of areal scales: multinational, national, state, and local. Statistical analysis of recent election returns to discover similar and contrasting patterns of voting behavior among and between different regions of the United States. Spatial distribution of voter attitudes and voter perception of political issues. Prerequisite: Geog 205 and Stat 51 or 91; or permission of instructor. Topic changes each year; may be repeated for credit. (Spring—evening)

295 **Research** (arr.) Staff

May be repeated once for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

Geology

Professors Geza Teleki *(Chairman)*, G.V. Carroll, Charles Milton *(Research)*, F.R. Siegel, W.A. Oliver, Jr. *(Research)*
Adjunct Professors J.W. Pierce, E.G. Kauffman, I.G. Sohn
Professorial Lecturers Nicholas Hotton, Daniel Appleman, P.M. Kier, H.T. Evans, Jr.
Associate Professors A.G. Coates, R.C. Lindholm, J.F. Lewis
Associate Professorial Lecturers W.E. Maloney, M.A. Buzas, J.E. Hazel, Isidore Zietz, W.G. Melson
Assistant Professorial Lecturers F.J. Collier, T.L. Hughes, E.T. Miller

Bachelor of Arts or *Bachelor of Science with a major in Geology (Departmental).*—Prerequisite: the Arts and Letters or the Science curriculum, respectively, pages 76–77. The following first-group courses must be included: Geol 1–2, 14; Chem 11–12; Phys 1 and 2 or B Sc 11–12; Math 31; Stat 91.

Required: in addition to the general requirements, pages 81–85, 24 semester hours in Geology beyond first-group courses for the Bachelor of Arts degree; 30, for the Bachelor of Science degree. The work of the junior and senior years must be approved by the Department. Two foreign languages are recommended for students planning to do graduate work. Phil 121 and 151 are recommended as senior-year electives.

Master of Arts or *Master of Science in the field of Geology.*—Prerequisite: the degree of Bachelor of Arts or Bachelor of Science, respectively, with a major in Geology from this University, or an equivalent degree.

Required: the general requirements, pages 90–96, including Math 31 or Stat 91, or equivalent, for the degree of Master of Science only. Geol 299–300 *Thesis Research* is required for both degrees. Candidates must pass the Master's Comprehensive Examination before registration for the second half of the thesis work. A reading knowledge examination in French, German, Russian, or Spanish (with permission of Department), must be passed before the second half of the work is started.

Master of Science in the field of Geochemistry (an interdepartmental degree offered by the departments of Geology and Chemistry).—Prerequisite: a Bachelor's degree with a major in Geology or in Chemistry from this University, or an equivalent degree.

Required: the general requirements, pages 90–96, including Chem 111, 112; Geol 141, 241, 249, and Geol 245 or Chem 213, and 299–300. The Master's Comprehensive Examination must be taken before registration for the second half of the thesis work. A reading knowledge examination in a foreign language, approved by the Department of Geology or Chemistry, must be passed before the second half of the work is started.

Doctor of Philosophy in the field of Geology.—Required: the general requirements, pages 90–94, 96–98, including passing a reading knowledge examination in an approved foreign language plus the satisfactory completion of Stat 117, 118, or 49; and the satisfactory completion of the General Examination in three fields, one of which must be in Petrology, Stratigraphy, or Structural Geology.

Research fields: Geomorphology, Mineralogy, Paleontology, Petrology, Sedimentology, Stratigraphy, and Structural Geology.

Doctor of Philosophy in the field of Geochemistry (an interdepartmental field offered by the departments of Geology and Chemistry).—Required: the general requirements, pages 90–94, 96–98, including passing a reading knowledge examination in an approved foreign language plus the satisfactory completion of Stat 117, 118, or 49; and the satisfactory completion of the General Examination in four fields, including geochemistry and chemistry.

Bachelor of Arts in Education with a teaching field in Earth Science.—Prerequisite: the Education curriculum, pages 78–79.

Required: the Earth Science option and the professional courses listed on pages 107–8, 115.

FIRST GROUP

Staff

1–2 **Introductory Geology** (3–3)

Lecture (2 hours), laboratory (2 hours), optional field trips. Survey covering the principles of geology. Laboratory fee, $12 a semester. (Academic year—day)

Staff

5 **Environmental Geology** (3)

Survey of geological principles and their application to environmental problems. Optional field trips. (Fall—evening)

Carroll

14 **General Petrology** (3)

Lecture (2 hours), laboratory and field (3 hours). Macroscopic study of rocks. Prerequisite: Geol 1–2 (concurrent registration for Geol 2 is accepted). Laboratory fee, $12. (Fall—day)

SECOND GROUP

Teleki

101 **History of Geological Sciences** (3)

Development of geological and scientific thought: history of geological and related sciences. (Fall—day)

Carroll

103 **Development of Scientific Thought** (3)

111–12 **Mineralogy** (4–4)

Lectures and laboratory. Geol 111: morphological and optical crystallography. Geol 112: paragenetic and systematic mineralogy. Admission by permission of instructor. Laboratory fee, $12 a semester. (Academic year—day)

Appleman

113 **Crystallography** (3)

Lectures and laboratory. Point-group and space-group theory, fundamentals of crystal structure, elementary X-ray diffraction theory, application of X-ray diffraction to mineral identification. Prerequisite: Math 31. Laboratory fee, $15. (1972–73 and alternate years: spring—day)

Staff

115 **Laboratory in Petrography** (arr.)

Specialized training in petrography. Admission by permission of instructor. Prerequisite or concurrent registration: Geol 117. May be repeated for credit. Laboratory fee, $12. (Fall and spring—day)

Lewis

117 **Petrology** (2)

Introduction to silicate phase systems; physics and chemistry of crustal and magmatic processes; classification, composition, and trends of igneous rocks; volcanic processes and products. Prerequisite: Geol 14, Phys 1 or equivalent. Required: concurrent registration in Geol 115. (Fall—day)

Carroll

122 **Structural Geology** (3)

Lectures and field trips. Genetic interpretation of geologic formations on basis of their structures; emphasis on applications to geologic field work. Prerequisite: Geol 14. Laboratory fee, $8. (Spring—day)

125 **Marine Geology** (3) **Pierce**

Lecture and map work. Principles of oceanography and submarine geology; geology of the deep sea; topography, crustal structure, sedimentary processes, and marine environment. Prerequisite: Geol 1–2. (Spring—evening)

128 **Geomorphology** (3) **Teleki**

Lecture (2 hours), laboratory and field trips as arranged. Nature and evolution of earth forms, interpretation of maps and aerial photographs. Prerequisite: Geol 1–2, or permission of instructor. (1972–73 and alternate years: fall—day)

136 **Engineering Geology** (3) **Staff**

For students in the School of Engineering and Applied Science. Geological principles and processes and their application to civil and mechanical engineering. Prerequisite: Math 31, Phys 2; or permission of instructor. (Spring—day)

141 **Introductory Geochemistry** (3) **Siegel**

Lecture (2 hours), laboratory as arranged. Principles and theories on the abundance, relationships, and distribution of the elements in various rock and mineral species. Prerequisite or concurrent registration: Geol 117 or equivalent; Chem 11–12; Math 30; Phys 1, 2. Laboratory fee, $12. (Fall—day)

147 **Chemical Geology in the Earth and Ocean Sciences** (3) Siegel

Introduction to geochemical and chemical principles involved in the understanding of geological systems, and their application to contemporary problems in oceanology, pollution, and mineral exploration. Laboratory fee, $12.

151–52 **Invertebrate Paleontology** (3–3) **Coates**

Lecture and laboratory (5 hours), field trips as arranged. A systematic treatment of the invertebrate fossil groups, emphasis on the macroinvertebrates. The evolution and paleoecology of the groups will be introduced. Prerequisite: Geol 1–2. Laboratory fee, $12 a semester. (Academic year—day)

154 **Vertebrate Paleontology** (3) **Hotton**

Lecture (2 hours), laboratory or field as arranged. General features of vertebrate morphology and evolution as illustrated by the fossil record; problems of paleoecology and adaptation, where appropriate. (Fall—evening)

155 **Evolution of Plants** (3) **Staff**

Lecture (2 hours), laboratory or field as arranged. General features of fossil plant morphology, evolution, and classification. Laboratory fee, $12. (1972–73 and alternate years)

157 **Methods of Systematic Paleozoology** (3) Sohn

Lecture and discussion. Introduction to bibliographic source and rules of zoological nomenclature. Presentation of data, including synonymies and keys. Prerequisite: Geol 151–52 or B Sc 101–2. (Spring—evening)

158 **Micropaleontology** (3) **Sohn**

Lecture (2 hours), laboratory as arranged. Identification with binocular microscope of important microfossil groups. Micropaleontological tech-

niques. Prerequisite: Geol 157 or permission of instructor. Laboratory fee, $12. (1972–73 and alternate years)

163 **Sedimentation** (4) Lindholm

Lecture (2 hours), laboratory (4 hours), field trips as arranged. Principles of sedimentation, analysis and interpretation of sedimentary processes and environment, laboratory experiments in the properties of sedimentary particles. Prerequisite: Geol 111 or permission of instructor. Laboratory fee, $15. (Fall—day)

166 **Principles of Stratigraphy** (4) Coates and Staff

Lecture (2 hours), laboratory (4 hours). Introduction to physical and biological stratigraphy. Prerequisite: Geol 151–52. (Fall—day)

172 **Regional Geology** (3) Staff

Lecture, research, and discussion of major geologic or physiographic regions. Prerequisite: Geol 122. (Spring—day)

181 **Oceanography I** (3) Maloney

Chemical and physical properties of sea water, movements of water masses, meteorological interrelations, ecology of marine plants and animals. Prerequsite: Math 33 or equivalent, or permission of instructor. (Spring—day)

182 **Oceanography II** (3) Maloney

Boundary processes and interactions between sea water and the atmosphere, principles of dynamics and their application to motion and distribution of variables, acoustics of water masses, review of recent literature and problems. Prerequisite: Geol 181. (1972–73 and alternate years)

187 **Geophysics for Geologists I** (3) Zietz

Basic geophysics to assist the geologist in detailed and regional mapping and in solving fundamental geologic problems. Emphasis on magnetic, gravimetric, and radioactive methods. Prerequisite: Math 31; Phys 1, 2. (1972–73 and alternate years: spring—evening)

188 **Geophysics for Geologists II** (3) Zietz

Basic geophysics to assist the geologist in mapping and in solving geologic problems. Emphasis on seismic, electric, and electromagnetic methods. Prerequisite: Math 31; Phys 1, 2.

199 **Undergraduate Research** (arr.) Staff

Problems approved by the staff. May be repeated once for credit. (Fall and spring)

THIRD GROUP

205 **Seminar in Geology** (3) Staff

Special topics each semester. May be repeated for credit. (Fall and spring)

212 **Crystal Chemistry** (3) Evans

(Fall—day)

214 **X-ray Mineralogy** (3) **Appleman**

Problems in X-ray mineralogy, crystal chemistry of rock-forming minerals. Laboratory fee, $15. (1972–73 and alternate years: spring—day)

216 **Sedimentary Petrography** (3) **Lindholm**

Identification, classification, and interpretation of common sedimentary rocks by means of the petrographic microscope. Prerequisite: Geol 112, 163; or permission of instructor. Laboratory fee, $15. (Spring—day)

219 **Petrogenesis** (3) **Lewis**

The origin of selected igneous and metamorphic rock types. (Spring—day)

224 **Advanced Structural Geology** (3)

Methods of study and the hypotheses of the genesis of structurally complex rock. Problems of orogeny. Prerequisite: Geol 122 or permission of instructor. (1972–73 and alternate years)

241 **Geochemistry** (3) **Siegel**

Chemical composition and physical properties of sea water, chemical composition and alterations of marine sediments, thermodynamics and biochemical activity in oceans. Methods of analysis and problems of measuring. Prerequisite: Math 32, Phys 51–52; or permission of instructor. Recommended: Chem 22. Laboratory fee, $18. (1972–73 and alternate years)

242 **Experimental Geochemistry** (3) **Staff**

Recent advances in geochemistry, instrumental methods and their application. Special topics. Does not repeat itself and may be repeated for credit. Prerequisite: Chem 111–12. (Spring—as arranged)

243 **Geochemical Prospecting** (3) **Siegel**

Application of geochemical principles and analyses to the detection of hidden ore deposits. Field trips as arranged. Laboratory fee, $15. (Spring—day)

245 **Thermodynamics for the Geologist** (3) **Melson**

Nature and definition of thermodynamics and the meaning of chemical equilibrium. Methods of graphical portrayal, significance and calculation in equilibrial relations and systems. Prerequisite: Math 32. Recommended: Math 33 and Phys 51–52. (Fall—evening)

246 **Physical Chemistry in Relation to Geologic Problems** (3) **Melson**

The origin of the atmosphere, equilibria in sea water, diagenesis, equilibrium in metamorphic rocks, composition and temperature-pressure relations in ore solutions, and the mechanism of ore formation; thermodynamics of magma. Prerequisite: Geol 245. (Spring—evening)

249 **Seminar: Geochemistry** (2) **Siegel**

Independent topics each semester; may be repeated for credit. (Spring)

253 **Applied Paleontology** (3) **Hazel and Staff**

Wide-ranging treatment of the use of fossils in several fields including biostratigraphy, paleobiogeography, paleotemperature; paleochemical analyses and the solving of particular geologic problems. Prerequisite: Geol 151–52. (1972–73 and alternate years)

254 **Interpretive Paleontology** (3) **Kauffman and Staff**

Comparative study of form and function in fossil and recent organisms as related to the interpretation of evolution. Prerequisite: Geol 151–52. (Spring—evening)

255 **Population Paleoecology (3)** **Buzas**

Characteristics of populations applicable to the fossil record. Subject matter includes ecosystem concept, habitat, Hutchinsonian niche, life-death, size frequency distributions, competitive exclusion principle, spatial distributions, relative abundance and diversity, quantification of community biofacies. Prerequisite: Geol 151–52, Stat 91; or permission of instructor. (1971–72 and alternate years: fall)

263 **Advanced Sedimentology** (arr.) **Pierce**

Prerequisite: Geol 163. Laboratory fee, $15. (1972–73 and alternate years)

295 **Research** (arr.) **Staff**

Research on problems approved by the Staff. Open to qualified students with advanced training. May be repeated for credit. (Spring)

299–300 **Thesis Research** (3–3) **Staff**

(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) **Staff**

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) **Staff**

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Germanic Languages and Literatures

Professor J.C. King
Associate Professors Klaus Thoenelt, Carl Steiner *(Chairman)*
Assistant Professorial Lecturer Margaret Guenther
Lecturer Blanche Gardner

Bachelor of Arts with a major in Germanic Languages and Literatures (Departmental).—Prerequisite: the Arts and Letters curriculum, page 76, including Germ 9–10 and 51–52.

Required: in addition to the general requirements, pages 81–85, a minimum of 24 semester hours in German courses above the first group, including Germ 179–80; reasonable proficiency in speaking and writing German; Hist 39–40 or equivalent; 6 semester hours in Philosophy selected with the approval of the adviser. Majors in Germanic Languages and Literatures are strongly advised to study French.

Master of Arts in the field of Germanic Languages and Literatures.—Prerequisite: a Bachelor of Arts degree with a major in Germanic Languages and Literatures from this University, or an equivalent degree.

Required: the general requirements, pages 90–96, including a reading knowledge of French. The program of study consists of (1) 24 semester hours of approved

course work plus a thesis (equivalent to 6 semester hours) in the field of German literature or linguistics or (2) 36 semester hours of approved course work without a thesis.

Doctor of Philosophy in the field of Germanic Languages and Literatures.—Required: the general requirements, pages 90–94, 96–98

Research fields: Old High German Language and Literature, Old Norse Language and Literature, Middle High German Language and Literature, Classicism, Realism, and 20th Century German Literature.

Bachelor of Arts in Education with a teaching field in German.—Prerequisite: the Education curriculum, pages 78–79.

Required: the German option and the professional courses listed on pages 110, 115.

Placement Examination: A standardized placement examination given before registration is required of all entering students who wish to continue in college the language begun in high school. Upon completion of the examination, assignment is made to the appropriate course, with credit assigned on the usual basis.

FIRST GROUP

1–2 **First-year German** (3–3) **Staff**

A year course: credit toward a degree at this University given on completion of Germ 2. Essentials of German grammar; translation of easy prose. Three classroom periods a week plus one period of aural-oral practice in language laboratory. Laboratory fee, $17.50 a semester. (Germ 1: fall—day and evening; spring—day. Germ 2: fall—day; spring—day and evening.)

3–4 **Second-year German** (3–3) **Staff**

A year course: credit toward a degree at this University given on completion of Germ 4. Selections from modern German prose; continuation and review of grammar. Three classroom periods a week plus one period of aural-oral practice in language laboratory. Prerequisite: Germ 1–2 or two years of high school German. Laboratory fee, $17.50 a semester. (Germ 3: fall—day and evening; spring—day. Germ 4: fall—day; spring—day and evening.)

*9–10 **German Conversation and Composition** (3–3) **Steiner**

(Academic year—day)

47 **Beginning German for Reading Examination Candidates** (0) **Staff**

Specifically for graduate students with little or no German who are preparing for reading examinations. No academic credit. Tuition fee, $222. (Fall and spring—evening)

49 **German Readings for Nonmajor Students** (3) **Staff**

Primarily for graduate students preparing for reading examinations. Undergraduates admitted with permission of instructor. No academic credit for graduate students. Prerequisite: Germ 4 or 47, or equivalent. (Fall and spring—evening)

*51–52 **Introduction to German Literature** (3–3) **Staff**

Lecture, recitation, and discussion in English. Selected readings in German literature from the earliest periods to the present. (Academic year—day)

* With permission of instructor, Germ 9–10 or 51–52 may be taken concurrently with Germ 4.

SECOND GROUP

103–4 **Goethe's "Faust"—Parts I and II** (3–3) Thoenelt

131–32 **18th Century German Literature** (3–3) Thoenelt
Enlightenment, Storm and Stress, Classicism. (1971–72 and alternate years: academic year—day)

141–42 **19th Century German Literature** (3–3) Steiner
Romanticism, Biedermeier, Young Germany, Realism. (1972–73 and alternate years: academic year—day)

151–52 **20th Century German Literature** (3–3) Staff
The age of Nietzsche, Naturalism, Expressionism, Kafka, Thomas Mann; contemporary drama; authors of Gruppe 47. (1971–72 and alternate years: academic year—evening)

161–62 **Studies in German Literature** (3–3) Staff
Readings of representative writers of short prose; lectures and discussions—in German.

179–80 **Advanced Conversation and Composition** (3–3) Staff
For undergraduate and graduate majors.

THIRD GROUP

201–2 **Middle High German** (3–3) King
(1971–72 and alternate years: academic year—evening)

209–10 **Old High German** (3–3) King
(1972–73 and alternate years: academic year—evening)

213–14 **Old Norse** (3–3) Allee
(1971–72 and alternate years: academic year—evening)

225–26 **Seminar: Linguistics** (3–3) King, Allee
Bibliography, methodology, readings, and research problems.

227–28 **Sanskrit—Introduction to Indo-European Linguistics** (3–3) King
Old Indic language and literature. (1971–72 and alternate years: academic year—evening)

231–32 **German Classicism** (3–3) Thoenelt
Advanced study and critique of the classical literature of the Goethe era. Prerequisite: Germ 131–32 or equivalent. (1972–73 and alternate years: academic year—evening)

251–52 **Seminar: Studies in 20th Century German Emigré Literature** (3–3) Staff
Special projects in fiction, drama, poetry, and criticism. (1972–73 and alternate years: academic year—evening)

271–72 **Seminar: German Realism** (3–3) Steiner
Analysis of authors, works, genres, and literary trends. (1971–72 and alternate years: academic year—evening. Topic for 1971–72: Stifter and Keller.)

299–300 **Thesis Research** (3–3) **Staff**
(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) **Staff**
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) **Staff**
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Greek

See "Classics."

Health Care Administration

Professors F.H. Gibbs, Leon Gintzig *(Chairman)*, W.A. Hamrick
Professorial Lecturer **M.J. Taves**
Associate Professors Lloyd Bartholomew, R.R. Bonato *(Research)*
Associate Clinical Professor Nina Woodside
Associate Professorial Lecturers G.E. Morris, W.A. Parker, E.P. Stanford
Assistant Professors P.N. Reeves, W.H. Guy *(Research)*, James McKeon *(Research)*
Assistant Professorial Lecturer H.R. Wertlieb
Instructors L.W. Katz, Patricia Cleary *(Research)*, Richard Switalski *(Research)*

Programs of study in Health Care Administration leading to the degrees of *Master of Arts in Health Care Administration, Master of Business Administration, Master of Public Administration, Post-Master's Graduate Certificate in Health Care Administration, Doctor of Business Administration,* and *Doctor of Public Administration* are offered by the School of Government and Business Administration (see pages 127–54).

SECOND GROUP

153–54 **Survey of Health Care Organization and Procedures** (3–3) **Parker**
Introduction to the history, concepts, and activities of health care systems in this country. Emphasis on organization and procedures used in various types of health care facilities. Prerequisite to HCA 154: HCA 153 or permission of instructor. Not open to Master's degree candidates in Health Care Administration. (Academic year—evening)

THIRD GROUP

202 **Introduction to Health Care Administration** (3) Bartholomew, Parker
Lecture and discussion (2 hours), laboratory (2 hours). Survey of state, national, and community health services; includes medical terminology,

communicable diseases, environmental sanitation, and biostatistics. (Fall—day)

203 **Health Care Organization and Management** (3) Hamrick, Parker

Lecture and discussion (2 hours), laboratory (2 hours). History and current character of institutional health care. Organizational functions and structure of various kinds of facilities related to health care administration. Prerequisite or concurrent registration: Mgt 201. (Fall and spring)

204 **Planning and Support Agencies and Associations** (3) Staff

Functions performed and special support techniques of hospital, medical, public health, nursing home, planning, educational, and similar associations.

205 **Hospital Management Procedures** (3) Hamrick

Lecture and discussion (2 hours), laboratory (2 hours). Departmental administration. Survey of hospital law; hospital forms, procedures, and systems; and hospital programs pertaining to disaster relief, safety, fire prevention. (Fall and spring—day)

206 **Case Studies in Health Care Administration** (3) Gintzig, Gibbs

Discussion (2 hours), laboratory (2 hours). General ideas about administration applied to practical cases. Emphasis on policy-making, planning, controlling, and organizing. Prerequisite: HCA 203 and Mgt 201. (Fall and spring—day)

207 **Management Analysis in Health Care Institutions** (3) Gintzig, Bartholomew

Lecture (2 hours), laboratory (2 hours). Basic investigation and problem-solving techniques, including various methods of collecting, analyzing, reporting, and using information that can be made available to administrators of hospitals and other medical care institutions. (Fall and spring)

209 **Health Care Economics and Financial Management** (3) Katz

Lecture (2 hours), laboratory (2 hours). Economic and financial analysis of the interactions between consumers of health care, providers of health care, and public and private prepayment and insurance programs. Industry price structure and the long- and short-term capital requirement of health care institutions. (Fall—day; spring—day and evening)

210 **Advanced Financial Management of Health Care Institutions** (3) Katz

Nature and interpretation of health care institution financial reports. Techniques of financial planning and control; operation of third-party reimbursement contracts; capital needs, planning, and acquisition; case studies, field research. Emphasis on nonprofit, short-term care institutions. Prerequisite: HCA 209. (Fall or spring)

212 **Health Project Planning** (3) Reeves, Woodside

Lecture (2 hours), laboratory (2 hours). Basic health planning methods and procedures for those students engaged in planning a specific facility or service. Prerequisite: HCA 202 and 203. (Spring)

213 **Administration of Health Care Systems** (3) Gintzig

Comparative evaluation of various organizational patterns, functions, and trends in health care systems by intensive examination of factors which have led to differentiating functions and reciprocal relationships. Emphasis on the sources of such differences and significance of the systems to the health care of a nation. (Fall or spring)

214 **Health Systems Planning** (3) Reeves, Woodside

Advanced health planning for those students concerned with development of health systems; emphasis on the legal, political, social, and economic factors influencing health planning. Prerequisite: HCA 212. (Fall or spring)

215 **Practicum in Health Project Planning** (3) Reeves, Woodside

Supervised practical instruction in agencies doing comprehensive health planning; emphasis on basic investigation and problem-solving techniques, including various methods of collecting, analyzing, and reporting data. Prerequisite: HCA 212. (Fall or spring)

216 **Seminar: Health Systems Planning** (3) Staff

An analysis of the effect of legal, political, social, and economic factors on the planning of health systems. This analysis will be conducted through the use of games and simulation models. Prerequisite: HCA 214 and 215. (Fall or spring)

250 **Mental Health Facilities and Resources: Functional Services, Organization, Administration, and Management** (3) Morris
(Formerly Administration for Mental Care)

Special characteristics of administration and management of mental health facilities—public and private mental hospitals, psychiatric units and services in general hospitals, community mental health centers, outpatient psychiatric clinics, and institutions for mental retardation.

260 **Seminar: Administration for Long-term Care** (3) Wertlieb
(Formerly Administration for Long-term Care Facilities)

Comparative evaluation of characteristics of long-term care institutions which will provide a knowledge of the variety of facilities providing long-term care, e.g., extended care, skilled nursing homes, homes and housing for the aged, etc.; internal and external professional services necessary to these facilities; relation of the purposes and functions of these institutions to the total health needs of the community. (Fall—day)

261 **Seminar: Administration for Long-term Care Institutions** (3) Wertlieb
(Formerly Business Procedures for Long-term Care Facilities)

Designed to improve the ability and effectiveness of health administrators through a foundation of knowledge and skills in health facility organization and management. Emphasis on range of services available in long-term care institutions.

265–66 **Readings in Long-term Care Administration** (3–3) Staff

Advanced studies in selected aspects of administration of long-term care facilities, including nursing homes, homes for the aged, and others. (Fall or spring)

267 **Social Gerontology for the Administrator** (3)

Special characteristics of the elderly with which administrators of long-term care facilities should be acquainted. (Fall and spring)

270 **Research in Health Care Administration** (3) Gintzig, Reeves
Field research. Primarily for doctoral candidates; open to other graduate students with consent of instructor. (Fall or spring)

285–86 **Readings in Health Care Administration** (3–3) Staff
Supervised readings in some special areas or subdivisions of health care administration. Primarily for doctoral candidates; open to other students by arrangement. (Academic year)

287 **Seminar: Integration of Health Care Administration** (3) Staff
Primarily for doctoral candidates; open to other students by arrangement. May be repeated once for credit. (Fall)

288 **Seminar: Field Problem Studies in Health Care Administration** (3) Staff
Selected administrative issues and problems arising in health care facility situations. Primarily for doctoral students; open to other students by arrangement. May be repeated once for credit. (Fall or spring)

293–94
–95 **Residency I** (3–3–3) Bartholomew, Gibbs, Hamrick, Katz, Reeves
Twelve-month residency, beginning each year June 1 or July 1. Work experience under a qualified preceptor, periodic written progress reports, and a written major report

296–97 Gintzig
–98 **Residency II** (3–3–3)
For selected students who take a second twelve-month residency; begins June 1 or July 1 each year. Staff

299–300 **Thesis Research** (3–3)
(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Gintzig, Reeves
Limited to doctoral students preparing for the general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Gintzig, Bartholomew, Reeves
Limited to doctoral candidates. May be repeated for credit. (Fall and spring)

History

Professors Wood Gray, H.M. Merriman, R.H. Davison, R.B. Thompson, F.H. Michael, R.C. Haskett, R.P. Sharkey, Mario Rodriguez, H.M. Sachar
Adjunct Professor R.P. Multhauf
Associate Professors C.J. Herber *(Chairman)*, R.W. Kenny, P.P. Hill, W.R. Johnson, Lois Schwoerer, Linda DePauw, Richard Thornton, Letitia Brown
Assistant Professors A.D. Andrews II, R.A. Hadley

Bachelor of Arts with a major in History (Field-of-Study).—Prerequisite: the Arts and Letters curriculum, page 76, including Hist 39–40 or 91–92, and 71–72.

Required: the general equiements, pages 81–85, and the passing of the History major examination in the senior year.

The major, and the major examination which attests it, is centered on the study of the Mediterranean rise, European development, and trans-Atlantic spread of Western Civilization, its interaction with other civilizations in a world context, and its continuing challenges to the present day. Under the guidance of an adviser the student will arrange his program in History to attain, insofar as possible, a balanced evaluation of (1) the rise of civilization in Europe from its Classical origins to the eve of the French Revolution; (2) the historic problems of modern Europe in the age of industry and ideology since 1789; (3) the political, social, economic, and cultural forces of the United States in their world setting since 1607; and (4) the nature and development of civilization in the principal areas outside of the North Atlantic community. Two 3-hour seminars, at least one of which must be research, are required as a part of each major's program (except Honors Program, see below). A required proseminar (Hist 199) is a means of integrating the student's understanding of the continuity of Western Civilization in its world context. For details relating to the administration and content of the major, see the pamphlet on this subject which is available in the offices of the Dean of Columbian College of Arts and Sciences and the Department of History.

An Honors Program may be chosen by juniors with satisfactory scholastic records. Application to this Program must be made shortly before completion of the first semester of the junior year. Students accepted into the Program take a 3-hour research seminar in the second semester of the junior year and complete the research requirements for the history major by preparing the Senior Honors Thesis (Hist 191–92) in the final year of undergraduate study. A special section of the proseminar is offered for students in the Honors Program in the first semester of the senior year.

Master of Arts in the field of History.—Prerequisite: A Bachelor's degree from an accredited college or university with a major in history, or an equivalent degree; high scholastic standing; and approval of the Department. Applicants from other institutions must present scores on the Graduate Record Examination with the Advanced Test in History and arrange for four persons, preferably former instructors, to send letters or reference forms to the Office of the Graduate School of Arts and Sciences.

Required: the general requirements, pages 90–96. Candidates must complete either (1) a minimum of 30 semester hours of second- and third-group courses, including History 299-300 *Thesis Research*, or (2) a minimum of 36 semester hours of second- and third-group courses, including at least two research seminars (6 semester hours). At least 6 semester hours of each candidate's program must be in third- or fourth-group History courses; a maximum of 6 may be in approved courses outside the Department of History. Master's candidates are responsible for arranging with instructors of second-group courses for extra work, in order to receive graduate credit for such courses. Each student works in two fields of history.

Doctor of Philosophy in the field of History.—Required: the general requirements, pages 90–94, 96–98, including the passing of a written examination in two foreign languages, normally French and German, and the satisfactory completion of the General Examination in four fields. Normally, each doctoral candidate will work in one major (or general) field of study and three special fields. The major fields include the following: Ancient History, Medieval Europe, Early Modern Europe, Modern Europe, United States, Latin America, Modern Near East, Modern Far East, Russia and East Europe. Special fields may vary from the topical (e.g., U.S. Social History, European Intellectual History, etc.) to the chronologically limited fields (e.g., American Colonial History, Tudor and Stuart England, etc.). A student may elect one special field outside of the Department of History if it is relevant to his program.

Bachelor of Arts in Education with a teaching field in History.—Prerequisite: the Education curriculum, pages 78–79.

Required: the History option and the professional courses on pages 110–11, 115.

Doctor of Philosophy fields of study in International Relations combine work in Economics, History, and Political Science.

Departmental prerequisite: Hist 39–40 or 91–92 is prerequisite to courses 108 through 158 and 187 through 196; Hist 71–72, to courses 167 through 185; either Hist 39–40, 71–72, or 91–92, to courses 162 through 166. Prerequisite to Hist 105–6 is either Hist 39–40, 91–92, or a background in a science. Students may waive one or more of the prerequisite courses by passing a departmental waiver examination, by attaining scores of 600 or above on the College Entrance Examination Board Achievement tests, or by good performance on Advanced Placement Examinations.

FIRST GROUP

Staff

39–40 **European Civilization in Its World Context** (3–3)

Primarily for freshmen. Hist 39: political, social, economic, and cultural history from ancient times to early modern era. Hist 40: from early modern era to present. Students cannot receive credit for both Hist 39–40 and 91–92. (Academic year—day and evening)

Staff

71–72 **Introduction to American History** (3–3)

Primarily for sophomores. Hist 71: political, social, economic, and cultural forces of the United States in their world setting from 1492 to 1861. Hist 72: from 1861 to present. (Academic year—day and evening)

Thompson

91–92 **World Civilization** (3–3)

Hist 91: major civilizations of the world to 1500. Hist 92: Europocentric and world civilization since 1500. Students cannot receive credit for both Hist 39–40 and 91–92. (Academic year—day)

SECOND GROUP

Multhauf

105–6 **History of Science** (3–3)

Hist 105: ancient natural philosophy and growth of special sciences through the 17th century scientific revolution. Hist 106: scientific development from the 18th century to the scientific revolution of the early 20th century. Prerequisite: Hist 39–40 or a background in science. (Academic year—evening)

Hadley

108 **The Ancient Near East and Egypt to 600 A.D.** (3)

Survey of Egyptian, Mesopotamian, Anatolian, West Semitic, and Iranian civilizations from the Neolithic period to the Islamic conquest. (Spring—day)

Hadley

109 **Early Aegean and Greek Civilizations to 200 B.C.** (3)

Neolithic background; Bronze age—Minoan, Helladic, and Mycenaean civilizations; classical Greek civilization to the eve of the Roman conquest. (Fall—day)

Hadley

110 **The Roman World to 455 A.D.** (3)

Prehistoric Italy; rise and decline of the Roman Empire and Latin civilization; cultural, social, and political developments in the Greek world under Roman rule.

111–12 **Medieval History** (3–3) Andrews

Development of the Latin Christian community. Hist 111: 4th to 11th century. Hist 112: 11th to 13th century. (Academic year—day)

113 **Early Middle Ages** (3) Andrews

Mediterranean region from 4th to 11th century; emphasis on Byzantium.

116 **History of Africa** (3)

Survey of political, cultural, and economic development from ancient times to the present.

121 **The Renaissance in Western Europe** (3) Schwoerer

Political, economic, intellectual, and cultural features of the Renaissance. 14th–16th centuries. Focus on Italy, but with attention to developments in France and England.

*127 **Theories of History** (3) Lavine

Critiques of philosophies of history: idea of progress, historicism, Hegelian-Marxian dialectic, cyclical, and social-scientific views. Contemporary problems of historical knowledge. (Fall—day)

131–32 **History of Germany** (3–3) Herber

Political, social, and cultural development. Hist 131: from Reformation to unification. Hist 132: from unification to present.

138 **History of World Communism** (3) Thornton

The international communist movement from its beginnings to the present. (Fall—day)

139–40 **World History in the 20th Century** (3–3) Sachar

Main diplomatic, political, and cultural factors that have influenced 20th century life. Hist 139: from the turn of the century to the Munich settlement of 1938. Hist 140: from the Munich settlement to the last third of the 20th century. (Academic year—day)

141–42 **History of France** (3–3) Herber

Political, social, and cultural. Hist 141: from earliest times to 1815. Hist 142: from 1815 to present. (Hist 142: fall—day)

143 **History of Eastern Europe** (3)

Poland, the Danube countries, and the Balkans in the 19th and 20th centuries. (Fall—evening)

145–46 **History of Russia** (3–3) Thompson

Rise and revolution of Russia. Hist 145: the Old Regime, 800–1900. Hist 146: Revolution and Soviet rule since 1900. (Academic year—day)

†147 **Economic History of Europe** (3) Sharkey

Economic development since the Middle Ages; emphasis on the period following the Industrial Revolution. Evolution of capitalism and its impact upon the societies of Europe. (Spring—day)

* An interdepartmental course offered by the departments of History and Philosophy.
† An interdepartmental course offered by the departments of History and Economics

149–50 **European Diplomatic History** (3–3) Davison

The European state system; diplomatic practices and relations since the Congress of Vienna; emphasis on policies and actions of the great powers and their statesmen. Hist 149: to 1890. Hist 150: since 1890. Students cannot receive credit for both Hist 150 and 157. (Academic year—day)

151–52 **History of England and Great Britain** (3–3) Kenny

Development of English civilization and its impact on Western culture. Hist 151: to 1689. Hist 152: since 1689. (Academic year—day)

153 **Tudor England** (3) Kenny

Aspects of the constitutional, social, intellectual, and religious development of England, 1485–1603. (Fall—day)

154 **Stuart England** (3) Schwoerer

Main currents from 1603 to 1714; emphasis on political, religious, social, and intellectual developments. (Spring—day)

157 **20th Century European Diplomatic History** (3) Sachar

The main currents, with necessary 19th century background. Students cannot receive credit for both Hist 157 and 150. (Fall—day)

158 **Modern Jewish History** (3) Sachar

A secular history of the Jewish people from the 18th century to the present state of Israel, with particular emphasis on European political, economic, and cultural influences. (Spring—day)

162 **History of Spain and Portugal** (3) Rodríguez

Political, social, and cultural aspects. (Fall—day)

163–64 **History of Latin America** (3–3) Rodríguez

Political, social, and cultural development. Hist 163: through independence. Hist 164: the national period. (Academic year—day)

165 **History of Brazil** (3) Rodríguez

Political, social, and cultural aspects.

166 **History of Mexico** (3) Staff

Political, social, and cultural aspects.

167 **American Colonial History** (3) Haskett

Settlement of colonies, development of provincial institutions, and emergence of American civilization in the 17th and 18th centuries. (Spring—day)

169 **The American Revolution** (3) DePauw

The crisis of the British Empire after the Seven Years War, the War for Independence, the Confederation period, the making and ratification of the Federal Constitution. (Fall—day)

170 **U.S. Early National History** (3) Hill

Political, diplomatic, economic, and social history of the early republic, 1789–1828. (Spring—day)

171–72 **U.S. Social History** (3–3) Gray

Hist 171: daily life, institutions, intellectual and artistic achievements of the Agrarian Era, 1607–1861. Hist 172: the Urban-Industrial Era from 1861 to present. (Academic year—day)

173–74 **The Negro in American History** (3–3) Brown

The place of Black Americans in the corpus of American history. (Academic year—day)

175–76 **U.S. Political History** (3–3) Haskett

Hist 175: to the Civil War. Hist 176: Civil War to New Deal. (Academic year—day)

177 **The Ante-bellum South** (3) DePauw

Development of the South as a section in the ante-bellum period. (Spring—day)

*179–80 **U.S. Economic History** (3–3) Sharkey

Process of economic growth from Colonial times to the present. Development of various sectors in the economy—such as agriculture, transportation, manufacturing, and banking—and their interdependence. Hist 179: 1607–1865. Hist 180: from 1865 to present. (Academic year—day)

181–82 **U.S. Diplomatic History** (3–3) Merriman, Hill

Tendencies toward isolation, expansion, and collectivism; disputes with foreign countries and their settlement; activities of American secretaries of state and diplomatic agents. Hist 181: to 1898. Hist 182: since 1898. (Hist 181: fall—day. Hist 182: spring—day and evening.)

183 **Oversea Expansion of the United States** (3) Merriman

Political, economic, social, and cultural life of our outlying possessions.

184 **Canada and the United States** (3) Merriman

Historical background and main trends in the relationship of the two English-speaking peoples of North America. (Spring—day)

185 **Representative Americans** (3) Gray

Significant and pivotal personalities in government, business, science, religion, journalism, the arts, and social reform. (Fall—day)

187 **History of Modern China** (3) Johnson

China since 1840, particular attention to political developments.

188 **History of Chinese Communism** (3) Thornton

Survey of the leadership, ideology, structure, and operation of the Communist Party of China from its founding to the present. (Spring—day)

191–92 **Senior Honors Thesis** (3–3) Staff

Required of and open only to undergraduate honors candidates in history. (Academic year)

193 **History of the Near East** (3) Davison

Byzantine, Arab, Persian, and Islamic backgrounds; rise and decline of the Ottoman Empire; action of European powers in the area; Ottoman

* An interdepartmental course offered by the departments of History and Economics.

breakup into the Turkish Republic and other successor states. (Fall—day)

194 **History of the Modern Near East** (3) Sachar

Beginning with Napoleon's invasion of Egypt. Interaction of Europe with western Asia, emphasis on such international issues as the Turkish Straits, Suez, Anglo-French imperialism; Turkish, Balkan, Arab, and Jewish nationalism, and the recent Soviet intrusion into the area.

195–96 **History of East Asia** (3–3) Johnson

Civilizations of China and Japan; emphasis on cultural development and social organization. Hist 195: beginnings to about 1800. Hist 196: traditional societies on the eve of the modern era, their responses to Western cultural influences since mid-19th century.

199 **Proseminar: Readings for the History Major** (3) Staff

Required of senior history majors. Readings and discussions on major trends in the history of Western civilization in their world setting; representative selections from the classics of historical literature. Students cannot receive credit for both Hist 199 and 201. (Fall and spring—day)

THIRD GROUP

Prerequisite to all third-group History courses: the appropriate second-group preparation and consent of instructor.

201 **History and Historians** (3) Staff

Students cannot receive credit for both Hist 201 and 199. (Fall and spring)

203–4 **Research Seminar** (3–3) Staff

Prerequisite: Departmental approval. (Academic year)

205–6 **Seminar: Modern History of Eastern Europe** (3–3) Petrov

East Central and Southeastern Europe in the 19th and 20th centuries. Hist 205: to the mid-1930's. Hist 206: to the communist take-over (1948). (Academic year—day)

208 **Research Seminar: History of World Communism** (3) Thornton

209–10 **Seminar: Ancient History** (3–3) Hadley

Prerequisite: Hist 108, 109, or 110; or equivalent. (Academic year—day)

211–12 **Seminar: Medieval History** (3–3) Andrews

Prerequisite: Hist 111–12 or equivalent. (Academic year—day)

215–16 **Junior Seminar** (3–3) Staff

Primarily for juniors. Study and discussion of selected topics. Admission by permission of instructor.

*231 **Seminar: Sino-Soviet Relations** (3) Michael

Background, development, and status of conflict within the communist movement; emphasis on the role of Chinese communists. Prerequisite: 3

* An interdepartmental course offered by the departments of History and Political Science.

semester hours selected from Hist 187; P Sc 101, 194; or equivalent. (Spring—day)

237 **Seminar: Soviet Foreign Policy, 1917–1953** (3) Petrov

Revolutionary concept of diplomacy. Parallel instruments of foreign policy during the era of "capitalist encirclement," 1917–1939. From Nazi-Soviet partnership to the alliance with the West, 1939–1945. Foreign policies of the cold war, 1945–1953. (Fall—day)

241–42 **Research Seminar: Modern European History** (3–3) Herber

Prerequisite: appropriate preparation and consent of instructor. (Academic year—day)

245–46 **Research Seminar: Russian History** (3–3) Thompson

Prerequisite: Hist 145–46 or equivalent. (Hist 245: fall—day)

249–50 **Research Seminar: European Diplomatic History** (3–3) Davison

Prerequisite: Hist 149 or 150 or equivalent. Reading knowledge of French or German required. (Hist 249: fall—day)

251–52 **Research Seminar: English History** (3–3) Kenny, Schwoerer

Prerequisite: Hist 151–52 or equivalent.

261–62 **Research Seminar: Latin American History** (3–3) Rodriguez

Prerequisite: 6 semester hours selected from Hist 162, 163–64, 165, 166. (Academic year—evening)

271–72 **Research Seminar: U.S. Social History** (3–3) Gray

Prerequisite: Hist 171–72 or equivalent. (Hist 272: spring—day)

*273–74 **Research Seminar: Materials in American Negro Culture** (3–3) Brown

Prerequisite: Hist 173–74 or equivalent. (1971–72 and alternate years: academic year—evening)

275–76 **Research Seminar: U.S. Political History** (3–3) Haskett

Prerequisite: Hist 175–76 or equivalent. (Academic year—day)

281–82 **Research Seminar: U.S. Diplomatic History** (3–3) Merriman

Prerequisite: Hist 181–82 or equivalent. (Academic year—day)

283–84 **Research Seminar: Recent U.S. History** (3–3) Hill

Prerequisite: 6 semester hours of 100-level American History courses. (Hist 283: fall—day)

285–86 **Research Seminar: Early American History, 1607–1828** (3–3) Hill, DePauw

Prerequisite: Hist 170, 175, or 181; or equivalent.

287 **Seminar: Problems in Latin American Civilization** (3) Rodriguez

Interdisciplinary seminar guided by a specialist within the methodology of his chosen discipline; each student writes a report on some aspect of a key theme (i.e., Nationalism) in Latin America's experience. Admission by permission of instructor. (Spring—day)

*Offered jointly by the Department of History and the American Studies Program.

288 **Research Seminar: History of Chinese Communism** (3) — Thornton
(Spring—day)

291 **Research Seminar: 20th Century Problems—Era of World War I** (3) — Sachar
(Fall—day)

292 **Research Seminar: 20th Century Problems—Era of World War II** (3) — Sachar
(Spring—day)

293–94 **Research Seminar: the Modern Near East** (3–3) — Davison
Prerequisite: Hist 193 or equivalent. (Hist 294: spring—day)

295–96 **Research Seminar: the Modern Far East** (3–3) — Johnson
Prerequisite: Hist 195–96 or equivalent.

299–300 **Thesis Research** (3–3) — Staff
(Fall and spring)

FOURTH GROUP

Prerequisite to all fourth-group History courses: the appropriate second-group preparation and consent of instructor.

Fourth-group History courses are limited to graduate students; but they are primarily for doctoral candidates.

311–12 **Readings in Medieval History** (3–3) — Andrews
(Hist 312: spring)

341–42 **Readings in Modern European History** (3–3) — Davison
(Hist 342: spring—day)

345–46 **Readings in Russian History** (3–3) — Thompson
(Hist 346: spring—day)

351–52 **Readings in English History** (3–3) — Schwoerer, Kenny
(Hist 352: spring—day)

361–62 **Readings in Latin American History** (3–3) — Rodríguez Gray

371–72 **Readings in American Social History** (3–3)
(Academic year—day) — Brown

*373–74 **Readings on the Negro in American Culture** (3–3) — Haskett
(1972–73 and alternate years)

375–76 **Readings in U.S. Political History** (3–3) — Sharkey
(Hist 375: fall—day)

†379–80 **Readings in Economic History** (3–3) — Merriman
(Academic year—evening)

381–82 **Readings in American Diplomatic History** (3–3)
(Hist 382: fall—day)

* Offered jointly by the Department of History and the American Studies Program.
† An interdepartmental course offered by the departments of History and Economics.

385–86 **Readings in Early U.S. History** (3–3) DePauw
(Hist 386: fall—day)

387–88 **Readings in the History of Sino-Soviet Relations** (3–3) Thornton
(Hist 388: fall—day)

395–96 **Readings in Modern Far Eastern History** (3–3) Johnson

398 **Advanced Readings and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Honors Program—Columbian College Lower Division

H.E. Yeide, Jr., *Coordinator*

Limited to selected sophomores (see pages 71–72).

FIRST GROUP

1 **Seminar: the Great Ideas of the West** (3)
Reading, discussion, and research involving works crucial to an understanding of the great Western ideas—their historical development and contemporary relevance. Examination of problems and categories that lie at the roots of most modern scholarly disciplines. (Fall—day)

21–22 **Seminar: Contemporary Problems** (3–3)
Reading, discussion, and research dealing with one major contemporary problem each semester, utilizing the perspectives and insights of various academic disciplines. (Academic year—day)

23 **Independent Honors Study** (3)
Admission by prior approval of Honors Program Advisory Committee. A major study project supervised by a faculty member. A significant paper or report required. (Spring)

Institute for Sino-Soviet Studies

MEMBERS OF THE INSTITUTE

F.H. Michael *(Director)*, C.F. Elliott, Andrew Gyorgy, H.C. Hinton, W.R. Johnson, W.H. Kraus, C.A. Linden, C.A. Moser, Vladimir Petrov, S.I. Ploss, Chung-wen Shih, R.B. Thompson, Richard Thornton, R.K. White, R.Y.C. Yin

ASSOCIATE MEMBERS OF THE INSTITUTE

Joseph Baclawski, Bernard Gordon, John Hardt, Tao-tai Hsia, Bernard Ramundo, Philip True, T.W. Wolfe

The Institute for Sino-Soviet Studies offers specialized graduate study in the School of Public and International Affairs. Students who lack background in Soviet and Chinese studies are required to take undergraduate courses selected by the adviser as prerequisite to graduate work.

For description of the objectives and programs of the Institute, see pages 166–67.

ECONOMICS

Hardt

267 Seminar: Soviet Economy (3)

Development of the Soviet-type economy. Organization, policies, and problems: monetary, fiscal, production, allocative, foreign trade, economic growth. Workshop: case studies on sectoral or problem areas. Prerequisite: graduate status; Econ 101, 102, 133, and 134, or equivalent; and permission of instructor. (Fall—evening)

Hardt

268 Seminar: Economic Theory and Development in Communist Countries (3)

Appraisal of the Soviet-type model for economic development in the institutional framework of Soviet and other communist processes of economic development. Workshop: case studies on Eastern European, Chinese, and other communist economies. Prerequisite: graduate status; Econ 101, 102, 133, and 134, or equivalent; and permission of instructor. (Spring—evening)

Yin

269 Economy of Communist China I (3)

Analysis of organization, operation, policies, and problems. Development of the economy under communism. (Fall—evening)

Yin

270 Economy of Communist China II (3)

Continuation of Econ 269, examining critical problems of development. Prerequisite: Econ 269 or permission of instructor. (Spring—evening)

GEOGRAPHY

Baclawski

265 Seminar: Geography of the Soviet Union (3)

Physical features, economic geography, natural and energy resources, industries. Soviet transportation system, agriculture, multinational population trends; emphasis on population patterns along borderlands, especially Sino-Soviet border. (Spring—evening)

True

266 Seminar: Geography of China (3)

Physical and economic geography; emerging industries, energy resources, transportation system. Emphasis on population "explosion"—its distribution and significance—and on regional geography, particularly on the Sino-Soviet border, Manchuria, Tibet, Mongolia, Inner Mongolia, and Sinkiang. (Fall—evening)

HISTORY

Prerequisite: appropriate preparation in second-group History courses and consent of instructor.

205–6 **Seminar: Modern History of Eastern Europe** (3–3) Petrov

East Central and Southeastern Europe in the 19th and 20th centuries. Hist 205: to the mid-1930's. Hist 206: to the communist take-over (1948). (Academic year—day)

208 **Research Seminar: History of World Communism** (3) Thornton

237 **Seminar: Soviet Foreign Policy, 1917–1953** (3) Petrov

Revolutionary concept of diplomacy. Parallel instruments of foreign policy during the era of "capitalist encirclement," 1917–1939. From Nazi-Soviet partnership to the alliance with the West, 1939–1945. Foreign policies of the cold war, 1945–1953. (Fall—day)

245–46 **Research Seminar: Russian History** (3–3) Thompson

Prerequisite: Hist 145–46 or equivalent. (Hist 245: fall—day)

288 **Research Seminar: History of Chinese Communism** (3) Thornton

(Spring—day)

295–96 **Research Seminar: the Modern Far East** (3–3) Johnson

Hist 295: social and intellectual revolution in Modern China; replacement of scholar-gentry by 20th century intelligentsia. Emphasis on radical change after 1919. Hist 296: development of U.S. Far Eastern policy since 1898; emphasis on coming of World War II and U.S. policy toward China since 1941. Prerequisite: Hist 195–96 or equivalent.

345–46 **Readings in Russian History** (3–3) Thompson

Russian 19th and 20th century history. Emphasis on political and intellectual movements reflecting the rise and fall of the revolutionary cycle. (Hist 346: spring—day)

387–88 **Readings in the History of Sino-Soviet Relations** (3–3) Thornton

(Hist 388: fall—day)

POLITICAL SCIENCE

213–14 **Comparative Communist Systems** (3–3) Linden

(P Sc 213–14 replaces former P Sc 230 Seminar: International Communism, and P Sc 284 Seminar: Comparative Communist Systems)

Comparative study of the communist world; examination of sources of both the unity and diversity of modern communism. Attention is given to the broad doctrinal-ideological and political aspects of communist systems, the patterns of politics within and among communist leaderships, and the critical relationship between communism and nationalism. A sequence of general topics and case studies in the second half of the course serves as a basis for examining changing trends and developments in the communist states and parties. (Academic year—day)

215–16 **Seminar: the Communist Camp in World Politics I–II** (3–3)

P Sc 215: significant issues of communism, particularly in the Soviet Union and Red China; concept and structure of "world socialist system"; intra-Bloc relations with emphasis on the Sino-Soviet dispute. Prerequisite: 3 semester hours in modern political theory. P Sc 216: political ramifications of the communist movement and its relations with the noncommunist world. Prerequisite: 3 semester hours in international relations or comparative government.

224 **Readings in Socialism and Communism** (3) Kraus

Readings and discussions of primary and secondary works to explore genesis and transformations of a strand of political speculation—from pre-Marxian and Marxian socialism to contemporary Marxism-Leninism. Prerequisite: 3 semester hours in modern political theory. (Fall—evening)

225 **Seminar: Marxism-Leninism** (3) Kraus

Crucial theoretical problems, such as the nature of revolution, dictatorship of the proletariat, transition to communism, imperialism, and national liberation in Marxian and contemporary communist doctrine. Prerequisite: P Sc 224 or permission of instructor. (Spring—evening)

227 **Seminar: Government and Politics of Eastern Europe** (3) Gyorgy

Comparative study of principal political, social, economic institutions; Soviet stake; patterns of Soviet domination; efforts toward economic and political integration; impact of the Sino-Soviet dispute; U.S. policy toward satellite nations. (Spring—day)

229 **Readings in Soviet Government and Politics** (3) Elliott

Readings in contemporary Soviet domestic government and politics. Prerequisite: 3 semester hours selected from Hist 146, P Sc 112, or equivalent. (Fall—evening)

*231 **Seminar: Sino-Soviet Relations** (3) Michael

Background, development, and status of conflict within the communist movement; emphasis on the role of Chinese communists. Prerequisite: 3 semester hours selected from Hist 187; P Sc 101, 194; or equivalent. (Spring—day)

232 **Seminar: International Communications** (3) Dasbach

East-West perspectives. Theory and history of national patterns of international communications focusing on basic political and psychological aspects of communication between major communist and noncommunist powers. (Spring—day)

233 **Seminar: Soviet Government and Politics** (3) Elliott

Research seminar in selected problems of Soviet domestic government and politics. Emphasis: since Stalin. Prerequisite: P Sc 229 or permission of instructor. (Spring—evening)

234 **The Soviet Political Process** (3) Staff

Influence of revolutionary ideas, traditions, and accidental events on Soviet organization, and on administration of Soviet social, economic, national, and military policies; application of these policies by leaders to maintain power. (Fall—day)

†237 **Chinese Law** (3) Hsia

Emphasis on the legal system of Communist China; analysis of the constitutional law of the People's Republic of China including general principles, state structure, and rights and duties of citizens; a brief survey of the administration of justice—courts, procuratorates, and lawyers; marriage law, land law; counterrevolutionary act and other criminal statutes;

* An interdepartmental course offered by the departments of Political Science and History
† Same as Law 547 (2). Graduate students registering for P Sc 237 make special arrangements with the instructor for supplementary assignments equivalent to one additional semester hour.

principles of civil law; communist Chinese concept of international law. (Spring—evening)

*238 **Soviet Law** (3) Ramundo

Concept of "socialist legality"; legal relationship of individual to state and other participants in Soviet society; role of Party in Soviet legal system; Soviet philosophy of law; state (constitutional) law: Soviet federalism, governmental apparatus, rights and obligations of citizenship; criminal law; property law; labor law; selected topics in civil law and procedure; international law. (Fall—evening)

253 **Seminar: Chinese Government and Politics** (3) Michael

Political institutions and concepts in late imperial times, during the revolution, under national government, and under communism. Emphasis on the communist period. Prerequisite: 3 semester hours selected from Hist 187; P Sc 101, 194; or equivalent. (Fall—day)

254 **Colloquium: Modern China** (3) Michael

Interuniversity research colloquium of faculty members of the Institute for Sino-Soviet Studies and other area universities from different disciplines concerned with the study of modern China. Critical discussions of research plans and studies in progress in weekly sessions. Advanced graduate students admitted with permission of faculty group. (Fall and spring—day)

255 **Colloquium: Russia and Eastern Europe** (3) Gyorgy

Interuniversity research colloquium of faculty members of the Institute for Sino-Soviet Studies and other area universities from different disciplines concerned with the study of Russia and Eastern Europe. Critical discussions of research plans and studies in progress in weekly sessions. Advanced graduate students admitted with permission of faculty group. (Fall and spring—day)

257 **Seminar: Communism in Developing Countries** (3)

Examination of international communist policy for, and communist parties in, developing countries. Case studies of Asia, Africa, and Latin America. Basic communist concepts of imperialism and nationalism; development and current application of Soviet and Chinese variants of strategy and tactics for "national liberation."

258 **Seminar: Communist Parties in the Noncommunist World** (3)

Movements and ideological variations of communist parties of France, Italy, the Scandinavian countries, and other Central and West European nations. Case studies on communist problems of Middle East and North African nations.

265–66 **Chinese Communist Policy Processes** (3–3) Hinton

Determinants of policy, view of the world, instrumentalities and locus of power, interrelationship between domestic and foreign policy, formulation and implementation of policy. Prerequisite to P Sc 265: 3 semester hours selected from P Sc 101, 194, or equivalent. Prerequisite to P Sc 266: P Sc 265 or equivalent. P Sc 265: readings. P Sc 266: research seminar. (Academic year—evening)

* Same as Law 546 (2). Graduate students registering for P Sc 238 make special arrangements with the instructor for supplementary assignments equivalent to one additional semester hour.

269 **Seminar: Soviet Foreign Policy** (3) Elliott

External policies and relations of the USSR; world objectives of Soviet leaders; relations with other communist states, Western powers, and other countries; international propaganda, disarmament policy, foreign economic relations. Prerequisite: 3 semester hours selected from Hist 137, 145–46, or equivalent. (Spring—evening)

270 **Political and Social Institutions of Eastern Europe** (3) Gyorgy

Major political and social factors which have shaped the inter-war, World War II, and post-war evolution of Eastern Europe. Emphasis on sociological and anthropological forces which have contributed to "Balkanization" of this area in the last fifty years. Each time the course is offered the concentration will be on one or two selected countries. (Fall—day)

274 **Principles and Problems of International Political Communication** (3)

Reading and discussion of public opinion/foreign policy relationships and operation of international political communication programs by major world powers as a tool of foreign policy. (Fall—evening)

288 **Seminar: Soviet Military Policy and Strategy** (3) Wolfe

Soviet developments in military policy and strategy with attention to intra-Bloc military cooperation, political context of Soviet military policy, significant changes in recent Soviet military thought. (Fall or spring)

294 **Seminar: Governments and Politics of Japan and Korea** (3)

Readings, research, and discussion on contemporary political problems and relevant historical background of Japan, North and South Korea. (Fall or spring)

295 **Seminar: Chinese Communist Foreign Policy** (3) Hinton

Objectives; formulation and implementation of foreign policy; Communist China as Asian state, revolutionary influence, would-be power. Prerequisite: 3 semester hours selected from P Sc 101, 194, or equivalent.

296 **Seminar: the Communist Role in Far Eastern International Politics** (3) Hinton

Evolution of communist strategy for Asia, armed struggle in South and Southeast Asia, wooing of national bourgeoisie, development of Asian communist states, local communist parties since World War II, Sino-Soviet rivalry. (Fall—evening)

298 **Southeast Asia in World Politics** (3) Gordon

Southeast Asia in great-power perspective. Overlapping and conflicting interests, foreign policies, and military requirements of the United States, Japan, China, and the USSR. Balance-of-power concept and development of Asian subsystem. (Spring—evening)

PSYCHOLOGY

259 **Seminar: Social Psychology of Communism** (3) White

Public and governmental opinion in communist countries, authoritarian thinking, communist propaganda, problems of Western communication with communist countries. (Fall—evening)

International Affairs

See "Public and International Affairs."

Italian

See "Romance Languages and Literatures."

Japanese

See "East Asian Languages and Literatures."

Journalism

Professorial Lecturer F.L. Dennis
Associate Professors R.C. Willson *(Chairman)*, Philip Robbins
Associate Professorial Lecturers H.L. Coppenbarger, T.R. Smith, G.E. Trainor, Peter Weaver
Assistant Professorial Lecturers H.E. Paine, Nancy Anderson

Bachelor of Arts with a major in Journalism (Departmental).—Prerequisite: the Arts and Letters curriculum, page 76, including Engl 51–52 or 71–72, Hist 71–72 or P Sc 5–6, and Jour 71–72.

Required: the general requirements, pages 81–85, including I and II below.

I. Twenty-four hours of second group courses in Journalism, as follows: (a) Jour 111, 196, 198; (b) 9 hours chosen from Jour 121, 133, 137, 138, 139; (c) 6 hours chosen from Jour 115, 116, 117, 140, 145, 146, 151, 190.

II. Twelve hours of second-group courses, chosen in consultation with the major adviser, in one other department of Columbian College of Arts and Sciences. Students selecting science may take courses in more than one department.

Departmental prerequisite: Jour 111 with a grade of High Pass or better is prerequisite to Jour 125, 133, 137, 138, 139, and 196.

FIRST GROUP

71–72 **Introduction to Mass Communication** (3–3) Willson
(Formerly Journalism in American Society)
Jour 71: evolution of newspapers and other media in relation to political, social, and economic life; concept of press freedom. Jour 72: mass media, problems of contemporary journalism, emphasis on media-government relations. (Academic year—day and evening)

SECOND GROUP

111 **Reporting** (3) Robbins
Gathering, evaluating, and writing news. (Fall and spring—day)

115 **Newspaper Editing and Make-up** (3) Coppenbarger

Preparation of news copy, pictures, and other graphic material for publication; evaluation of news; page layouts; newspaper make-up. (Spring—day)

116 **Magazine Layout and Design** (3) Paine

Layout, typography, and design for magazines, newsletters, house organs, and similar publications for associations, institutions, and industry. (Fall—evening)

117 **Magazine Editing** (3)

The editor's responsibility to publisher and readers. Setting the editorial goals and planning content and production to meet them. Editing copy for general and specialized magazines.

121 **Feature Writing** (3) Willson

Free-lancing magazine articles, material obtained through independent investigation. (Fall—day)

125 **Science Writing** (3)

Writing science news for the mass media.

133 **Advanced Reporting: Community News** (3) Robbins

Coverage and writing of local news. (Fall—day)

137 **Advanced Reporting: National Affairs** (3)

Coverage and writing of federal government news from the point of view of the press association. (Spring—day)

138 **Investigative Reporting** (3)

In-depth reporting in selected areas of political, economic, and social affairs. (Fall and spring)

139 **Advanced Reporting: Radio and Television News** (3)

Preparing news and public affairs programs for broadcast media. (Spring—evening)

140 **Photojournalism** (3) Smith

Photographic techniques affecting publication, illustration and story angle, standards of judgment in selection and use of pictures, captions, editing, technique, cropping for effective reproduction. (Spring—evening)

145 **Principles and Problems of Public Relations** (3) Trainor

Principles, problems, and ethics of public relations for government agencies, commercial establishments, educational and other public institutions. Case histories of successful programs. (Fall—evening)

146 **Government Information** (3)

Growth of information activities in government and the role of the information specialist. Writing and editing for government information operations. (Spring—evening)

150 **News Coverage in Washington** (3) Robbins

A survey of the way news is gathered and reported in the Nation's Capital by wire services, newspaper bureaus, and the local dailies. Field trips to major news centers; practice coverage.

151 **Editorial Writing** (3) Robbins

Techniques of editorial writing, conducting the editorial page, function of editorials and columns of news commentary in a free press. (Spring—day)

190 **Internship in Journalism** (3)

Study of a journalistic medium in action by assignment to a Washington area news office. Admission restricted to Journalism majors selected by a departmental committee. (Fall and spring—as arranged)

196 **Seminar** (3) Willson

For Journalism majors only. Research, individual and team writing of news, features, interpretative reports, and editorials on current major problem areas. (Spring)

198 **Law of the Press** (3) Dennis

Freedom of the press, censorship, legislative controls, publications as contempt of court, copyright, newsgathering agencies, labor law and the newspaper business, law of libel, privileged matter, fair comment on public characters, right of privacy. (Fall—evening)

Latin American Studies

COMMITTEE ON LATIN AMERICAN STUDIES

Mario Rodríguez *(Chairman)*, Leslie Brownrigg, T.F. Carroll, Marvin Gordon, H.H. Hinrichs, R.L. Humphrey, J.W. Robb, K.L. Storrs

Bachelor of Arts with a major in Latin American Studies (Interdepartmental).—Prerequisite: the Arts and Letters curriculum, page 76. The language requirement should be satisfied in Spanish.

Required: in addition to the general requirements, pages 81–85, (1) 18 semester hours distributed as follows: Anth 172 or 185, Geog 161, Hist 163–64, and 6 semester hours chosen from Span 151–52, 155–56, 157–58, or other approved courses; (2) 18 semester hours, including an interdisciplinary seminar (287), in one of the following areas: Anthropology, Economics, Geography and Regional Science, History, Political Science, or Hispanic Literature; (3) 24 semester hours of electives, chosen in consultation with an adviser.

Master of Arts in the field of Latin American Studies.—Prerequisite: a Bachelor's degree with a major in Latin American Studies, or equivalent. Majors in other fields may be considered for admission to Master's candidacy provided their undergraduate record includes sufficient course work in three of the following six areas: Anthropology, Economics, Geography and Regional Science, History, Political Science, and Hispanic Literature.

Required: in addition to the general requirements, pages 90–96, (1) a major emphasis of 12 semester hours of graduate work in one of six areas: Anthropology, Economics, Geography and Regional Science, History, Political Science, or Spanish American Literature; (2) two graduate seminars (6 semester hours each)—one seminar in each of two of those areas not chosen for the major emphasis; (3) a thesis (299–300), 6 semester hours, in the area of major emphasis (in special cases students may take 12 semester hours in lieu of the thesis); (4) demonstration of proficiency in Spanish or Portuguese, or in English if the student's native language is Spanish or Portuguese; (5) the passing of a Master's Comprehensive Examination in the area of major emphasis and in the two minor areas.

Candidates for the degree of Doctor of Philosophy may elect Latin American History as an area of specialization in the field of History, Spanish American Literature as an area of specialization in the field of Romance Languages and Literatures, or Politics of Latin America as an area of specialization in the field of Political Science.

The following courses dealing with Latin America are currently available.

ANTHROPOLOGY

170 *Cultures of the Caribbean* (3)	Staff
171 *Native Peoples of North America* (3)	Humphrey
172 *Native Peoples of South America* (3)	Brownrigg
185 *Latin American Archeology* (3)	Humphrey
262 *Seminar: Applied Anthropology* (3)	Brownrigg
268 *Seminar: Peasant Society* (3)	Krulfeld
282 *Seminar: Advanced Archeology—North American Prehistory* (3)	Humphrey
287 *Seminar: Problems in Latin American Civilization* (3)	Rodríguez

ECONOMICS

185–86 *Economic History and Problems of Latin America* (3–3)	Hinrichs Carroll
233 *Seminar: Agrarian Reform and Development in Latin America* (3)	Carroll
234 *Seminar: Evaluation of Rural Development Projects in Latin America* (3)	Staff
285–86 *Economic Development of Latin America* (3–3)	Rodríguez
287 *Seminar: Problems in Latin American Civilization* (3)	

GEOGRAPHY AND REGIONAL SCIENCE

127 *World Population and Settlement* (3)	Gordon
161 *Latin America* (3)	Gordon
287 *Problems in Latin American Civilization* (3)	Rodríguez

HISTORY

162 *History of Spain and Portugal* (3)	Rodríguez
163–64 *History of Latin America* (3–3)	Rodríguez
165 *History of Brazil* (3)	Rodríguez
166 *History of Mexico* (3)	Staff
261–62 *Research Seminar: Latin American History* (3–3)	Rodríguez
287 *Seminar: Problems in Latin American Civilization* (3)	Rodríguez
361–62 *Readings in Latin American History* (3–3)	Rodríguez

POLITICAL SCIENCE

177 *Governments and Politics in Latin America* (3)	Storrs
178 *Latin America: Political Patterns and International Relations* (3)	Storrs
277–78 *Seminar: Latin American Politics* (3–3)	Storrs
287 *Seminar: Problems in Latin American Civilization* (3)	Rodríguez

SPANISH

151–52 *The Spanish American Novel* (3–3)	Robb
155–56 *Spanish American Literature to 1880* (3–3)	Robb
157–58 *Spanish American Literature since 1880* (3–3)	Robb
253 *Seminar: Studies in Modern Spanish American Poetry* (3)	Robb
255 *Seminar: Studies in 20th Century Spanish American Theater* (3)	Robb
256 *Seminar: Studies in Mexican Narrative Prose* (3)	Robb
261 *Seminar: Studies in Spanish American Essayists* (3)	Robb
264 *Seminar: Studies in Recent Spanish American Fiction* (3)	Robb
266 *Seminar: Alfonso Reyes* (3)	Robb
287 *Seminar: Problems in Latin American Civilization* (3)	Rodríguez

Linguistics—Graduate Study

COMMITTEE ON LINGUISTIC STUDY 1970–71

J.G. Allee, Jr. *(Chairman)*, V.K. Golla, J.W. Hillis, J.C. King, J.N. Mosél, Charles Mudge, Chung-wen Shih, Irene Thompson

Master of Arts in the field of Linguistics.—An interdepartmental degree, directed by the Committee on Linguistic Study. Interested students should consult the Chairman of this Committee.

Prerequisite: a Bachelor's degree with a major (with a grade of high *B* or above) in one of the following, or equivalent. (1) An undergraduate major in French, German, Russian, or Spanish. (2) An undergraduate major in Anthropology, English, Linguistics, Mathematics, Philosophy, Psychology, Speech, or Statistics, together with a proficiency in French, German, Russian, or Spanish. (3) An undergraduate major in Education with a teaching field in French, German, Russian, or Spanish. (4) An undergraduate major in Education with a teaching field in English, Mathematics, or Speech, together with a proficiency in French, German, Russian, or Spanish.

Required: the general requirements, pages 90–96. The requirements are (1) 24 semester hours of course work as outlined in Groups I, II, and III, below, plus a thesis (equivalent to 6 additional semester hours); or (2) 24 semester hours of course work as outlined in Groups I, II, and III, below, plus 12 additional semester hours, not previously elected, from Groups I, II, and III. There is no thesis requirement if students elect the 36 semester hour requirement listed under number 2.

Group I—15 semester hours consisting of Anth 162; 3 semester hours of the Structure of Modern English; Germ 227–28; plus 3 semester hours selected from Anth 161, Engl 115, Psyc 115, or Sp&D 176.

Group II—6 semester hours selected from Anth 193, 261; Engl 213–14; Fren 212, 213–14; Germ 201–2, 209–10, 213–14, 225–26; Slav 125, 126, 215–16; Span 215–16. With the approval of the adviser students may substitute, if not previously elected, courses from Group I.

Group III—3 semester hours selected from Asia 123–24; Math 101, 102, 122, 123, 201–2; Phil 221; Psyc 289; Sp&D 101, 279, 291, 292, 295; Stat 131, 161–62. With the approval of the adviser students may substitute, if not previously elected, courses from Groups I and II.

There is no undergraduate major in the field of Linguistics.

Students may elect Linguistics in the field of Romance Languages and Literatures toward the degree of Doctor of Philosophy.

Graduate students are urged to consult the Committee on Linguistic Study and the appropriate catalogues concerning courses which can be taken under the agreement for the Consortium of Universities of the Washington Metropolitan Area, Inc.

For descriptions of courses listed below, see the Courses of Instruction section of this catalogue.

ANTHROPOLOGY

161 *Language and Culture* (3) — Golla
162 *Linguistics in Anthropology* (3) — Golla
193 *Anthropological Methods* (3) — Krulfeld
261 *Field Methods in Linguistics* (3) — Golla

EAST ASIAN LANGUAGES AND LITERATURES

123–24 *Introduction to Chinese Linguistics* (3–3) — Staff

ENGLISH

115 *Introduction to English Linguistics* (3) — Allee
213–14 *Old English* (3–3) — Allee

GERMANIC LANGUAGES AND LITERATURES

201–2 *Middle High German* (3–3) — King
209–10 *Old High German* (3–3) — King
213–14 *Old Norse* (3–3) — Allee
225–26 *Seminar: Linguistics* (3–3) — King, Allee
227–28 *Sanskrit—Introduction to Indo-European Linguistics* (3–3) — King

MATHEMATICS

101 *Introduction to Mathematical Logic* (3) — Nelson
102 *Axiomatic Set Theory* (3) — Nelson
121–22 *Introduction to Abstract Algebra* (3–3) — Lee and Staff
123 *Linear Algebra* (3) — Lee and Staff
201–2 *Mathematical Logic* (3–3) — Nelson

PHILOSOPHY

221 *Seminar: Logical Theory* — Griffith

PSYCHOLOGY

115 *Psychology of Language and Communication* (3) — Mosel
289 *Seminar: Current Topics in Experimental Psychology* (3) — Staff
295 *Independent Research in Psychology* (arr.) — Staff

ROMANCE LANGUAGES AND LITERATURES

FRENCH

212 *Historical French Grammar* (3) — Staff
213–14 *Medieval French Literature* (3–3) — Staff
295 *Independent Reading and Research in French Literature* (arr.)

SPANISH

215–16 *Old Spanish* (3–3) — Staff
295 *Independent Reading and Research in Spanish and Spanish American Literature* (arr.)

SLAVIC LANGUAGES AND LITERATURES

125 *Russian Linguistic Structure* (3) — Thompson
126 *Contrastive Russian-English Analysis* (3) — Thompson
215 *History of the Russian Language* (3) — Thompson
216 *Comparative Slavic Phonology and Morphology* (3) — Thompson

SPEECH AND DRAMA

101 *Phonetics* (3) — Brewer
171 *Bases of Speech and Hearing* (3) — Hillis
176 *Speech, Hearing, and Language Development* (3) — Fox
279 *Anatomy and Physiology of Speech and Hearing* (3) — Bowling
291 *Seminar: Speech Pathology* (3) — Staff
292 *Seminar: Audiology* (3) — Staff
295 *Independent Research in Speech and Hearing* (arr.) — Staff

STATISTICS

131 *Contingency Table Techniques* (3) — Kullback
161–62 *Information Theory* (3–3) — Kullback

Management Science

Professors R.F. Ericson, G.L. Lippitt, D.D. Roman, Edwin Timbers, M.M. Wofsey
Professorial Lecturers C.W. Clewlow, M.H. Schwartz, Jerome Bracken
Associate Professors J.F. McCarthy, Jr., R.L. Holland *(Chairman)*, L.H. Mantell, E.K. Winslow, Jerry Harvey
Adjunct Associate Professor H.C. Demoody
Associate Professorial Lecturers Leonard Ackerman, Joseph Jarecki, J.T. McGill
Assistant Professors Elizabeth Adams, J.W. Waldrip, W.E. Smith, John Lobuts, Jr., F.H. Dorner, D.B. Rasmussen
Assistant Professorial Lecturers F.L. Cundari, W.H. Farthing, Reid Henderson, Jr.

SECOND GROUP

118 **Introduction to Data Processing** (3) — Demoody, Waldrip
(Formerly B Ad 118)
Basic data processing principles and methods. A management-oriented introduction to the fundamentals, potentials, and problems of computer-based data processing as a tool for record-keeping, resource-controlling, and decision-making. (Fall and spring—day)

119 **Data Processing Programming** (3) W. Smith
(Formerly B Ad 119)
Basic principles and methods of computer programming. General methods of problem-solving illustrated through analysis, flow charting, and programming of business-oriented data processing problems. Students write programs in FORTRAN and COBOL using the University's IBM 360 computer. Prerequisite: Mgt 118. (Spring—day)

120 **Data Processing Systems** (3) Demoody, Waldrip
(Formerly B Ad 120)
Assessment of the systems concept and its relationship to management, organization, data, and information. Principles and techniques of analysis, design, and implementation of computer-based data and information systems; management of systems planning resources. (Fall—day)

THIRD GROUP

201 **Advanced Administrative Management** (3) Mantell, Eastin, Brown
Advanced course in administration emphasizing principles and practices common to administrative units of all kinds. (Fall and spring—day and evening)

203 **Mathematics for Management** (3) Holland, Paik, Dorner
Mathematical concepts employed in the solution of management problems. Applications of analytical geometry, functions, elements of calculus, and linear algebra to optimization problems. Prerequisite: algebra. (Fall—day and evening; spring—evening)

204 **Quantitative Factors in Administration** (3) Holland, Paik, Boyd, Dorner
Survey of quantitative techniques used in the solution of management problems. Potentials and limitations of mathematical models and proper areas for their application. Topics include probability, statistical decision theory, linear programming, waiting line, inventory replacement models. (Fall and spring—day and evening)

207 **Human Behavior in Organizations** (3) Lippitt, Winslow
Individual, group, intergroup, and other human behavior and development; application of social science research to administration. Practical applications emphasized. (Fall and spring—day and evening)

208 **Current Issues in Organizational Behavior** (3) Lippitt, Winslow
Study of behavioral factors relating to issues such as automation, ethics, labor-management relations, and similar problems. Problems in behavioral science research. Prerequisite: Mgt 207. (Fall and spring—evening)

210 **Behavioral Factors in the Process of Change** (3) Lippitt
Current research and theory related to the process of change. Basic principles of planned change; individual, group, organization, community, and cultural change. Emphasis on human behavior research related to the change process. Prerequisite: Mgt 208. (Fall—day)

212 **Organizational Development: Concepts and Methods** (3) Lippitt
Primarily for doctoral students. Examination of different concepts of organizational structure and growth. Models of organizational change will be developed with a taxonomy of methods of initiating action to

further organizational development. The methods of action, research, team building, confrontation methods, objectives analysis, survey research, and structural revision will be related to organizational development. Prerequisite: Mgt 210 or equivalent. (Spring—evening)

213 **Consultative Processes in Organizations** (3) Winslow

Primarily for doctoral students. Examination through actual practice as well as theory of the nature of the helping process between one person or group and another person or group. Dynamics of the consulting process will be explored as well as role differences in internal and external consultation. Development of skill in the helping relationship will be furthered within the framework of interpersonal relation concepts and laboratory experiences. Prerequisite: Mgt 210 or equivalent. (Fall—evening)

218 **Survey of Data Processing** (3) Adams, McCarthy, Wofsey, Demoody

A management-oriented presentation of the vocabulary, concepts, and trends in computer hardware and software, information systems design and development, organizational impact, and effective management; milestones of past and current research; computer technology as a rapidly evolving force of major significance in business, government, and industry. Designed to provide comprehension of information technology necessary for contribution to an organizational data processing effort or as preparation for more advanced study. Prerequisite: Mgt 201, 204, 207; or permission of instructor. (Fall and spring—day and evening)

219 **Digital Computer Programming Concepts** (3) W. Smith

Programming concepts, techniques, and practices as applied to third generation computers. Fundamentals of higher-level languages, flow charting, FORTRAN, COBOL, operating systems, and utility programs. Student programs are run on the University Computer Center's IBM 360 computer. This course will provide the student with an understanding of the role of computer programming in management information systems and management research. Prerequisite: Mgt 218 or permission of instructor. (Fall and spring—evening)

220 **Comparative Digital Computer Systems and Their Management** (3) Wofsey, Schwartz

Characteristics and capacities of the range of data processing equipment in use today, special purpose equipment in business and government, recent and prospective equipment developments, and selection of computers and related equipment. Prerequisite: Mgt 218 or permission of instructor. (Fall and spring—evening)

221 **Management Information Systems Development and Application** (3) McCarthy

Development of management information systems, integration of data processing in operations of government or business, impact on management organization and decision-making. Case studies. Prerequisite: Mgt 218 or 219, 224; or permission of instructor. (Fall—evening; spring—day and evening)

222 **Seminar: Advanced Digital Computer Concepts** (3) Wofsey

Current problems in the design and implementation of computer-based systems; emphasis on current state-of-the-art through discussion with leading experts in the field and analysis of literature. Admission by permission of instructor. (Fall and spring—evening)

223 **Management of a Data Processing Organization** (3) Adams

Advanced course in information technology: emphasis on principles, practices, and trends in the management of data processing. Unique problems, functions, and requirements of data processing management, stressing executive interaction in decision-making, planning, and evaluative functions. Prerequisite: Mgt 218 and either 219 or 220; or permission of instructor. (Fall and spring—evening)

224 **Theory and Management of Systems** (3) Mantell, Ericson

Advanced course in systems, emphasizing systems theory and the capacities, capabilities, and management of current, large systems. Analysis of components and elements of systems and their association with management concepts. Applications; various techniques and potential problems for implementation. Systems of the future are projected with consideration of quantitative and technological developments. Particular emphasis on computer-based and communications-oriented systems. Prerequisite: Mgt 201, 204. (Fall—evening)

225 **Introduction to Managerial Statistics** (3) Dorner, McGill

Introduction to the mathematics of probability and statistics and its applications in management science and operations research. Topics include random variables; discrete and continuous probability distributions; moments and other descriptive measures; sampling theory; and an introduction to statistical estimation, hypothesis testing, and regression analysis. Prerequisite: Mgt 203 or equivalent. (Fall and spring—evening)

226 **Managerial Statistics** (3) Dorner, McGill

Management applications of the theory and techniques of mathematical statistics. Topics include maximum likelihood and other methods of estimation, hypothesis testing, descriptive measures of bivariate distributions, regression and correlation, analysis of time series, econometric models and multiple regression, statistical decision theory, and the revision of probabilities in decision-making. Prerequisite: Mgt 225. (Fall and spring—evening)

227 **Mathematical Programming: Techniques and Applications** (3) Bracken

Technical and management considerations of linear and nonlinear programming. Mathematical and computational aspects of linear programming. Formulation of linear programming models. Studies of applications of linear programming. Introduction to theory and application of nonlinear programming. Prerequisite: Mgt 203 or equivalent. (Fall—evening)

228 **Systems Analysis by Simulation** (3) Bracken, Holland

Methods of systems analysis via computer simulation. Particular attention to inventory models, although queuing systems and management planning models are also covered. Prerequisite: Mgt 226.

229 **Seminar: Management Science and Operations Research** (3) Bracken

Supervised study in depth and advanced projects in management science and operations research. Prerequisite: Mgt 226, 227; or permission of instructor. (Spring—evening)

230 **Administration of Research and Development** (3) D. Roman
(Formerly B Ad 229)

Examination of technological, political, and economic factors affecting the R&D environment; operational aspects; management problems in military, governmental, and industrial organizations; project selection, resource allocation, personnel, planning and control, measurement and evaluation. (Fall—day)

231 **Seminar: Administration of Research and Development** (3) D. Roman
(Formerly Mgt 230)

Individual and/or group in-depth research projects dealing with various phases of research and development management. Topic will vary each time the course is offered according to the emerging technology, current operational problems, and student interest. Prerequisite: 6 to 9 semester hours of research and development management or permission of instructor.

262 **Seminar: Contemporary Administrative Theory** (3) Ericson

Primarily for doctoral students. An overview of current and prospective theory and practice from an inter- and trans-disciplinary viewpoint. Topics addressed include general systems theory, game theory, axiology and management values, antithetics, value engineering, cybernetic systems, decision theory, innovation and creativity models, and general semantics. Prerequisite: Mgt 201, 204, 207. (Fall and spring—evening)

263 **Organization and Management** (3) Ericson

Contemporary management theory; emphasis on application of management concepts in organizational practice. Comparative studies of current organizational designs and management processes. Prerequisite: Mgt 201, 204, 207.

268 **Management Engineering** (3) Clewlow

Analysis of the techniques for initiation and implementation of management engineering programs; emphasis on organization and methods surveys, including the study of work measurement, work simplification, management audits, and other management improvement programs. (Spring—evening)

295 **Research Methods** (3)

Research techniques, sources of information, array and analysis of data, interpretation and presentation of the findings. (Fall and spring)

Mathematics

Professors David Nelson, T.P.G. Liverman *(Chairman)*, Hewitt Kenyon, Choy-Tak Taam
Professorial Lecturers D.M. Dribin, Joseph Blum, B.J. McDonald, A.B. Willcox
Associate Professors W.A. Smith, Dagmar Henney, Irving Katz, I.I. Glick, M.D. Green, Ruth Bari, Myrna Lee
Associate Professorial Lecturers N.P. Callas, R.L. Eisenman, D.C. Peterson, G.B. Gollehon, J.V. Ryff
Assistant Professors E.A. Stone, H.D. Junghenn
Assistant Professorial Lecturers Mabel Morris, R.P. Pikul, Ruth Koidan

Bachelor of Arts or *Bachelor of Science with a major in Mathematics (Departmental).*—Prerequisite: the Arts and Letters or the Science curriculum, respectively, pages 76–77.

Required: in addition to the general requirements, pages 81–85, 24 semester hours of approved second- and third-group Mathematics courses, including Math 106, 121, 123, 139, 140.

Bachelor of Arts or *Bachelor of Science with a Major in Applied Mathematics (Departmental).*—Prerequisite: the Arts and Letters or the Science curriculum, respectively, pages 76–77, including Math 31, 32, 33, 34.

Required: the general requirements, pages 81–85. The 60 semester hours required for graduation are distributed as follows:

I. Thirty semester hours of Mathematics and Statistics courses, as follows: Math 111, 112, 139, 140, 181–82; Stat 189–90; and 6 semester hours chosen from second- and third-group Mathematics and Statistics courses, in consultation with the adviser.

II. Eighteen semester hours to be selected, in consultation with the adviser, from the following Areas of Application (A, B, or C below). At least 12 semester hours must be chosen from one Area, and the other 6 semester hours must be chosen from courses numbered 101 or higher. For courses in Civil Engineering, Electrical Engineering, Engineering Administration, Measurement Science, and Mechanical Engineering, see the *School of Engineering and Applied Science* catalogue.

A. Social and Management Sciences—courses chosen from CE 183, 195, 197; Econ 1–2, 101, 102, 123, 199; E Ad 115, 261, 269, 270, 272, 273, 275, 276, 277, 278, 279, 281–82, 283, 284, 296; EE 184, 283, 284, 285; Math 101, 102, 113, 124; Stat 113, 117, 118, 131, 157–58, 159, 161–62, 165–66, 188, 197.

B. Engineering and Physical Sciences—courses chosen from Chem 111–12, 113; CE 120, 121–22, 140, 166, 167, 168, 185, 186, 190, 191, 192, 193, 196, 198, 201, 202, 203, 204, 205, 206, 207, 210, 213, 220, 223, 252, 253, 254, 258, 261, 262, 263, 275; Stat 107, 117, 118, 131, 157–58, 159, 161–62, 197; and any course offering in Electrical Engineering, Measurement Science, Mechanical Engineering, or Physics.

C. Computer Sciences—courses chosen from EE 152, 153, 154, 157, 158; Math 102, 113, 124, 142, 153, 154, 157; Stat 113, 157–58, 161–62, 165–66, 197.

III. Twelve semester hours of electives.

Master of Arts in the field of Mathematics.—Prerequisite: a Bachelor's degree with a major in Mathematics from this University, or an equivalent degree.

Required: the general requirements, pages 90–96. Students must complete either (1) 30 semester hours of approved course work, including Math 299–300 *Thesis Research* or (2) 36 semester hours of approved course work without a thesis. The language requirement (see pages 95–96) must be satisfied in French, German, or Russian.

Master of Arts or *Master of Science in the field of Applied Mathematics.*—Prerequisite: a Bachelor's degree with a major in Mathematics or a related field such as Statistics, a physical science, Engineering, or Economics.

Required: the general requirements, pages 90–96, including satisfying the language requirement in French, German, or Russian. Course work is divided between Mathematics courses and courses from one Area of Application—Economics, Engineering (Civil, Electrical, Mechanical, or Engineering Administration), Physics, Statistics, Urban and Regional Planning. Courses in the chosen Area of Application are selected in consultation with the relevant department.

Candidates for the degree of *Master of Arts* must complete 30 semester hours of approved course work, including Math 299–300 *Thesis Research*. At least 12 semester hours must be in Mathematics courses, with no more than 3 of these from second-group courses. The remaining courses are chosen from the selected Area of Application. Theses are jointly supervised by the Department of Mathematics and the department concerned with the Area of Application.

Candidates for the degree of *Master of Science* must complete 36 semester hours course work; at least 18 of these must be in Mathematics courses, with no more an 6 semester hours from second-group courses. There is no thesis requirement.
Master of Science for Teachers.—Prerequisite: A Bachelor's degree; at least 12 mester hours or equivalent in Mathematics courses, including the equivalent of ath 31; experience in teaching mathematics at the secondary school level.
Required: 30 semester hours of approved second- or third-group Mathematics urses, including Math 168.
Doctor of Philosophy in the field of Mathematics.—Required: the general require-ents, pages 90–94, 96–98. The Departmental doctoral program committee, after nsultation with the student, will stipulate (1) courses which must be taken to fill the 48-semester-hour requirement leading to the General Examination; (2) e two languages, selected from French, German, and Russian, which must satisfy e foreign language requirement; and (3) the four areas of study in which the dent must prepare for the General Examination. The doctoral program committee appoint a Director of Research when the student has selected (preferably early his program) one of the following research fields for his dissertation: Functional alysis (Abstract Differential Equations, Functional Equations, Generalized Func-ons, Groups of Operators), Group Representations, Linear Algebra (Matrix The-y), Logic, Measure and Integration, Ordinary and Partial Differential Equations, eory of Numbers, and Topology (General Topology, Analytic Topology, Topo-gical Groups).
Bachelor of Arts in Education with a teaching field in Mathematics.—Prerequisite: e Education curriculum, pages 78–79.
Required: the Mathematics option and the professional courses listed on pages -12, 115.

RST GROUP

3 **College Algebra** (3) **Morris and Staff**

Equivalent to the standard two years of high school algebra with several additional topics. Prerequisite: one year each of high school algebra and high school geometry. (Fall and spring—day and evening)

6 **Plane Trigonometry** (3) **Morris and Staff**

Prerequisite: two years of high school algebra and one year of high school geometry, or Math 3 (or concurrent registration therefor). (Fall and spring—day and evening)

9 **General Mathematics I** (3) **Smith and Staff**

For students electing Math 9 and 10 as a terminal sequence. Logic, sets, number systems. Prerequisite: two years of high school mathematics. (Fall and spring—day and evening)

10 **General Mathematics II** (3) **Smith and Staff**

Mathematical systems, geometry, and introduction to statistics and probability. Prerequisite: Math 9. (Fall—evening; spring—day and evening)

30 **Precalculus** (3) **Bari and Staff**

Set theory, inequalities, basic analytic geometry, functions and relations. Polynomial, trigonometric, logarithmic, and exponential functions. Prerequisite: Math 3 and 6; or one and one-half years of high school algebra, one year of high school geometry, and one-half year of high school trigonometry; or equivalent. Prior to registration, new students should take a placement examination in algebra and trigonometry. (Fall and spring—day and evening)

31 **Calculus of One Variable** (3) Green and Staff

Differentiation and integration of algebraic and elementary transcendental functions, with simple applications. Prerequisite: Math 30 or equivalent.* (Fall and spring—day and evening)

32 **Calculus of Several Variables** (3) Green and Staff

Partial derivatives, multiple integrals, infinite series. Prerequisite: Math 31. (Fall and spring—day and evening)

33 **Calculus of Vector Functions** (3) Green and Staff

Elementary linear algebra, vectors, and matrices. Vector calculus, implicit function theory. Prerequisite: Math 32. (Fall and spring—day and evening)

34 **Introduction to Linear Algebra** (3) Katz and Staff

Linear functions, solutions of equations, dimension and rank, determinants, eigenvalues, change of basis. Prerequisite: Math 31 or permission of instructor. (Fall and spring—evening)

SECOND GROUP

101 **Introduction to Mathematical Logic** (3) Nelson

Introduction to proof theory and model theory of propositional and predicate calculi, computability, topics from foundations of mathematics. Open to sophomores with permission of Department. Prerequisite: Math 32 or permission of instructor. (Fall—late afternoon)

102 **Axiomatic Set Theory** (3) Nelson

Zermelo-Fraenkel set theory, ordinals and cardinals, foundations of the real number system. Prerequisite: Math 101 or permission of instructor. (Spring—evening)

106 **Introduction to Topology** (3) Green

Prerequisite: Math 139 or permission of instructor. (Spring—evening)

107 **Introduction to Algebraic Topology** (3) Bari

Prerequisite: Math 122 and 139, or permission of instructor.

111 **Mathematics for Engineers and Physicists I** (3) Liverman and Staff

Differential equations, linear and multilinear algebra, Fourier series. Prerequisite: Math 33, 34; or permission of instructor. (Fall—evening)

112 **Mathematics for Engineers and Physicists II** (3) Liverman and Staff

Fourier integral, Laplace transform, partial differential equations. Prerequisite: Math 111. (Spring—evening)

113 **Graph Theory** (3) Bari and Staff

Directed and undirected graphs; bridges, cutpoints, and blocks; connectivity; partitions; Eulerian and Hamiltonian graphs; planarity; coloring problems. Prerequisite: Math 32.

121–22 **Introduction to Abstract Algebra** (3–3) Lee and Staff

Selected topics in elementary number theory, groups, rings (including polynomial rings), and fields. Open to sophomores with permission of

* Math 30 may be waived as a prerequisite requirement by examination on scheduled dates.

Department. Prerequisite: Math 32 or permission of instructor. (Academic year—evening)

123 **Linear Algebra** (3) Lee and Staff

Theory of vector spaces, linear transformations, and matrices. Quadratic and bilinear forms, spectral decomposition. Prerequisite: Math 121. (Fall—late afternoon)

124 **Introduction to Matrix Theory** (3) Katz and Staff

Operations on matrices, linear equations, matrix inversion, vector spaces, characteristic roots and vectors, spectral theorem, quadratic forms. Prerequisite: Math 32, 34. (Fall—evening)

134 **Introduction to Boundary Value Problems** (3) Blum

Prerequisite: Math 111 or 142. (1972–73 and alternate years—spring)

135 **Projective Geometry** (3) Dribin

Prerequisite: Math 123 or 124, or equivalent. (Fall—evening)

139 **Advanced Calculus I** (3) Liverman and Staff

Review and extension of elementary one-variable calculus, emphasis on the theoretical foundations; differential calculus of several variables. Prerequisite: Math 33. (Fall and spring—evening)

140 **Advanced Calculus II** (3) Liverman and Staff

Differential and integral calculus of several variables; implicit function theorem; differential forms. Prerequisite: Math 139 or equivalent. (Spring—evening)

142 **Theory of Differential Equations** (3) Glick and Staff

Prerequisite: Math 139. (Fall—evening)

153 **Introduction to Numerical Analysis** (3) McDonald

Introduction to fundamentals of numerical analysis using modern digital computers. Solution of linear systems and of ordinary differential equations. Interpolation polynomials, iterative solution of nonlinear equations, simple quadrature techniques. Prerequisite: Math 111 or 139, or equivalent. (1972–73 and alternate years)

154 **Difference Equations** (3) McDonald

Introduction to finite difference equations and their solution. Physical examples and analogies with differential equations are employed to motivate and supply the techniques developed. Generating functions, analysis of error and stability characters. Prerequisite: Math 111 or 139, or equivalent. (1972–73 and alternate years)

157 **Introduction to Complex Variable Theory** (3) Henney and Staff

Prerequisite: Math 139. (Spring—evening)

*160 **Introduction to Abstract Algebra for Teachers** (3) Bari and Staff

Basic algebraic structures, such as groups, rings, integral domains, and fields; properties of integers and rational numbers. Prerequisite: Math 31 or equivalent.

*Open only to candidates for the degree of Master of Science for Teachers, teachers for in-service training, or students recommended by the Department of Education.

*161 **Introduction to Linear Algebra for Teachers** (3) Bari and Staff

Linear functions, solution of equations, quadratic forms, change of basis. Prerequisite: Math 31 or equivalent. (Spring—evening)

*162 **Introduction to Geometric Theories for Teachers** (3) Bari and Staff

Postulational developments of Euclidean and non-Euclidean geometries. Prerequisite: Math 31 or equivalent.

*163 **Advanced Calculus for Teachers** (3) Bari and Staff

Rigorous re-examination of one-variable calculus, emphasis on limit, continuity, differentiability, Riemann integration. Prerequisite: Math 160 or permission of instructor. (Fall—evening)

*164 **Foundations of Mathematics for Teachers** (3) Bari and Staff

Logic, set-theory, and foundations of the real number system. Prerequisite: Math 31 or equivalent.

*165 **Introduction to Theory of Numbers for Teachers** (3) Bari and Staff

Selected topics from theory of numbers. Prerequisite: Math 31 or equivalent.

*166 **Introduction to Graph Theory for Teachers** (3) Bari and Staff

Graph theory with applications to matchings, networks, programming, economics, psychology, biology, puzzles. Prerequisite: Math 31 or equivalent.

*167 **Introduction to Topology for Teachers** (3) Bari and Staff

Elements of topology with some simple applications. Prerequisite: Math 163 or permission of instructor. (Fall—evening)

*168 **Seminar: Curriculum Studies** (3) Bari and Staff

Critical examination of secondary school mathematics curricula, techniques, and programs. Prerequisite: Math 31 and permission of instructor.

*169 **Proseminar in Mathematics for Teachers** (3) Bari and Staff

Topics in mathematics; emphasis on directed individual research. Prerequisite: Math 31 and permission of instructor. (Spring—evening)

181–82 **Seminar: Applied Mathematics** (3–3) Glick and Staff

Prerequisite: Math 140, Stat 189–90, some knowledge of linear algebra, senior status as a major in Applied Mathematics. (Academic year—evening)

191 **Special Topics** (arr.) Staff

Admission by permission of instructor. May be repeated for credit. (Fall or spring)

195 **Reading and Research** (arr.) Staff

Under the personal direction of an instructor. Limited to Mathematics and Applied Mathematics majors with demonstrated capacity. Prior approval of instructor required. May be repeated for credit. (Fall or spring)

* Open only to candidates for the degree of Master of Science for Teachers, teachers for in-service training, or students recommended by the Department of Education.

HIRD GROUP

201–2 **Mathematical Logic** (3–3) Nelson
(Academic year—evening)

220 **Algebraic Number Theory** (3) Lee
(Formerly Theory of Numbers)
Prerequisite: Math 266.

237–38 **Theory of Functions of a Complex Variable** (3–3) Glick and Staff
Prerequisite: Math 140. (Academic year—evening)

239–40 **Ordinary Differential Equations** (3–3) Glick
Prerequisite: Math 123 or 124; 140. (1972–73 and alternate years)

243–44 **Numerical Analysis** (3–3) McDonald
Elements of theory and practice of numerical analysis using modern digital computers. Solution of linear systems and nonlinear equations, computation of eigenvalues and eigenvectors, basic approximation theory, interpolation techniques, numerical quadrature, solution of differential equations. Prerequisite: Math 124, 111 or 139; or equivalent. (Academic year—late afternoon)

250 **Measure and Integration** (3) Taam
Lebesgue measure and integration, measure and integration in abstract spaces, the Daniell integral. Prerequisite: Math 140. (Fall—late afternoon)

251–52 **Real and Abstract Analysis** (3–3) Liverman
Elements of topology; filters, compactness, metric spaces. Continuity and double limits. Banach and Hilbert spaces. Vector to vector functions; implicit function theorem. Introduction to generalized function spaces. Prerequisite: Math 106, 123, and 140; or equivalent. (1972–73 and alternate years)

255 **Differential Geometry** (3) Dribin
(1972–73 and alternate years)

257 **Lie Algebras** (3) Katz
(Formerly Lie Groups)
Prerequisite: Math 267.

258 **Group Representations** (3) Lee
Prerequisite: Math 267. (Spring—evening)

259 **Topics in Algebra** (3) Katz
(Formerly Advanced Topics in Group Theory)
Prerequisite: Math 266.

261–62 **Principles and Methods of Applied Mathematics** (3–3) Liverman
Definition of distributions of Schwartz and Gelfand-Silov. Operational and integral transform methods applied to the existence theory and explicit solution of ordinary and partial differential equation problems of mathematical physics. Structure of distributions and ultradistributions. Schwartz kernel theorems. Engineering and physics applications. Prerequisite: Math 124, 140, and 157; or permission of instructor. (Academic year—evening)

Katz

265–66 **Modern Algebra** (3–3)
Fundamental concepts of theory of groups, rings, and fields; theory of finite fields, extension fields, Galois groups, factorization theory in Gaussian domains and groups with operators. Prerequisite: Math 123 or equivalent. (Academic year—evening)

Katz

267 **Theory of Rings and Algebras** (3)
(Formerly Topics in Matrix Theory)
Prerequisite: Math 266. (Fall—late afternoon)

Glick

269 **Integral Equations** (3)
Prerequisite: Math 123 or equivalent; Math 139, 140.

Glick

270 **Tensor Analysis** (3)
Prerequisite: Math 123, 140; some acquaintance with elementary topology.

Glick

277 **Partial Differential Equations** (3)
Prerequisite: Math 140. (1972–73 and alternate years)

Stone

281–82 **General Topology** (3–3)
(1972–73 and alternate years)

Bari

285 **Algebraic Topology** (3)

Taam

287–88 **Functional Analysis** (3–3)
Fundamental results of functional analysis. Students participate in classroom presentation and discussion. Topics include abstract integration and measure theory, linear topological spaces, Hilbert and Banach spaces, weak topology, Bochner's integral, Banach algebras and application to spectral representation, semi-groups of operators, differential equations in Banach spaces. Prerequisite: Math 238; 250; 106 or 251. (Academic year—late afternoon)

Taam

289–90 **Topics in Functional Analysis and Applications** (3–3)
Qualified students encouraged to work with instructor on research projects. Topics selected to serve research interests of instructor and students. Prerequisite: Math 288 or equivalent. (1972–73 and alternate years)

Staff

291–92 **Seminar** (3–3)
(Academic year)

Staff

295 **Reading and Research** (3)
May be repeated once for credit. (Fall and spring)

Staff

299–300 **Thesis Research** (3–3)
(Fall and spring)

FOURTH GROUP

Staff

398 **Advanced Reading and Research** (arr.)
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

Staff

399 **Dissertation Research** (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Microbiology

Professors Mary Louise Robbins, R.C. Parlett *(Chairman)*, Rudolph Hugh
Professorial Lecturers F.B. Gordon *(Virology)*, Dorothy Heilman *(Cellular Immunology)*, M.S. Legator *(Microbial Genetics)*, E.M. Lerner II, L.J. Griffith
Associate Professors L.F. Affronti, Melvin Reich, Kun-yen Huang
Assistant Professors G.L. Wright, Jr., Yang-Ming Chu
Assistant Professorial Lecturers P.J. Price, Rosalie De Giovanni-Donnelly

Master of Science in the field of Microbiology.—Prerequisite: a Bachelor's degree with a major in Biology, Botany, Chemistry, or Zoology from this University, or an equivalent degree. The undergraduate program must have included the following courses or equivalent: B Sc 11–12; Chem 11–12, 51–52, 53–54; Math 30, 31 (31 may be taken concurrently with the graduate program); Phys 1, 2.

Required: the general requirements, pages 90–96. The 30 semester hours of course work must include Micr 201 (if not presented for admission), plus 220, 277–78, 299–300, Epid 230, and Bioc 221–22. The remaining academic work should consist of graduate-level courses selected with the approval of the instructor.

Master of Science in the field of Mycology.—An interdepartmental degree offered by the departments of Biochemistry, Epidemiology and Environmental Health, and Microbiology.

Prerequisite: a Bachelor's degree with a major in Biology, Botany, Chemistry, or Zoology from this University or an equivalent degree. The undergraduate program should have included the following courses, or equivalent: B Sc 11–12; Chem 11–12, 51–52, 53–54.

Required: the general requirements, pages 90–96. Candidates must complete either 1) a minimum of 33 semester hours including Micr 299–300 *Thesis Research*, or 2) a minimum of 39 semester hours without a thesis. The required courses in this program are Bioc 221–22; Epid 201, 217, 230 (2 semester hours); Micr 201, 225, 231.

Doctor of Philosophy in the field of Microbiology.—Required: the general requirements, pages 90–94, 96–98. Candidates must fulfill the tool requirement by passing a reading knowledge examination in French and German or by passing an examination in one of these languages and satisfactorily completing the tool requirement in Biostatistics. The General Examination covers at least four fields, two of which must be in microbiological disciplines.

Research fields: Determinative Bacteriology, Immunochemistry, Immunology, Microbial Genetics, Microbial Pharmacology, Microbial Physiology, and Virology

201 **Medical Microbiology** (6) — Parlett and Staff

Bacteria, rickettsiae, viruses, yeasts, molds, protozoa, metazoa which relate to the health and disease of man—cultural studies, methods of diagnoses, theories. Laboratory fee, $16. (Spring)

214 **Tissue Cell Culture and Somatic Variation** (4) — Chu, Price

Techniques of tissue culture and means of studying somatic variations. Prerequisite: Micr 201 or equivalent. (Spring—day)

219–20 **Scientific Writing for Graduate Students** (1–1) — Robbins

Required of all graduate students prior to writing a thesis or dissertation. (Academic year—day)

221 **Methods of Scientific Presentation for Graduate Students** (1) — Wright

Photography and graphic arts presentation of research data for publication and scientific meetings. Prerequisite: Micr 219–20. Laboratory fee, $16. (Fall—day)

225 **Microbial Physiology I** (3) Affronti, Reich

Morphology and biochemistry of various microorganisms with emphasis on bacteria. Prerequisite: Bioc 221–22, Micr 201. (Fall—day)

226 **Microbial Physiology II** (3) Affronti, Reich

Effects of physical and chemical agents on microorganisms with emphasis on antibiotics. Prerequisite: Mic 225 or permission of instructor. (Spring—day)

230 **Immunology** (4) Wright

Fundamental immunologic concepts. Seriologic and immunologic procedures as applied to clinical and research situations emphasized in the laboratory. Prerequisite: Micr 201 or equivalent. Laboratory fee, $16. (Fall—day)

231 **Cellular Immunology** (1) Staff

Study of immunological functions of reticulo-endothelial tissues, theories of autoimmunity, graft rejection, tumor immunity, delayed hypersensitivities, and heritable immunogenic defects. (Fall—day)

233 **Biology of Viruses** (4) Robbins, Huang

Biochemical and genetic characterization of viruses. Prerequisite: Micr 201 or equivalent. Laboratory fee, $16. (Fall—day)

235 **Systematic Bacteriology** (2) Hugh

History of bacterial classification, international rules of nomenclature as applied to bacteria, development of bacterial classification based on relationships, survey of characteristics of bacterial groups. Prerequisite: Micr 201 or equivalent. (1972–73 and alternate years: fall—day)

251 **Bacteriology** (2) Hugh

Clinical situations involving bacteriology. Prerequisite: Micr 201 or equivalent. (Fall—day)

255 **Virology** (2) Huang, Robbins

General principles of virology; emphasis on clinical situations. Prerequisite: Micr 201 or equivalent. (Fall—day)

257 **Experimental Immunochemistry** (3) Wright

Biochemical and physiochemical characterization of antigens and antibodies. Prerequisite: Bioc 221–22 or equivalent, Micr 230. Laboratory fee, $16. Limited enrollment. (1971–72 and alternate years: spring—day)

258 **Microbial Genetics** (2) De Giovanni-Donnelly, Legator

Survey of microbial systems that depict basic concepts of genetic principles. Prerequisite: Micr 201 or equivalent. (Spring—day)

277–78 **Seminar: Microbiology** (1–1) Staff

Required of graduate students. (Academic year—day)

293 **Special Topics in Microbiology** (arr.) Staff

Selected topics in microbiology. May be repeated for credit. (Fall and spring—day)

295 **Research in Microbiology** (arr.) **Staff**

Content differs each time the course is offered; may be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) **Staff**

(Fall and spring)

398 **Advanced Reading and Research** (arr.) **Staff**

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) **Staff**

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Music

Professor George Steiner *(Chairman)*
Associate Professors Robert Parris, N.A. Tilkens
Assistant Professorial Lecturers N.O. Scribner, Jr. *(Organ)*, Margaret Tolson *(Piano)*, J.E. Stephens *(Trumpet)*, Nancy Mandel
Studio Lecturers in Applied Music Marian McNabb *(Piano and Organ)*, Constance Russell *(Piano)*, Malinee Peris *(Piano)*, Phyllis Gieseler *(Voice)*, S.H. Prussing *(Voice)*, R.A. Norris *(Guitar)*, E.C. Johns *(Guitar)*, R.C. Raffaelle *(Guitar)*, Gretchen Scharf *(Guitar)*, J.E. Marlow *(Guitar)*, Patricia Cochran *(Violin)*, Richard Parnas *(Violin and Viola)*, J.S. Martin, Jr. *(Cello)*, Morris Kirshbaum *(Cello)*, N.M. Irvine *(Bass)*, T.P. Perazzoli *(Flute)*, W.H. Mann *(Flute)*, R.O. White *(Oboe)*, W.R. Huntington *(Clarinet, Recorder, and Saxophone)*, Walter Maciejewicz *(Bassoon)*, S.E. Ramsay *(French Horn)*, R.H. Kraft *(Trombone)*, Faith Carman *(Harp)*, T.H. Wardlow *(Percussion Instruments)*

Bachelor of Arts with a major in (1) *Music History and Literature*, (2) *Music Theory*, or (3) *Applied Music (Departmental)*.—Prerequisite: the Arts and Letters curriculum, page 76, or equivalent, including Mus 5–6.

Required: in addition to the general requirements, pages 81–85, Mus 103–4 and 131–32; a minimum of 4 semesters in Music Ensemble groups (or evidence of equivalent experience); 24 semester hours of second-group courses as follows:

1. *For the major in Music History and Literature.*—Twelve semester hours of Music History and Literature courses, 6 hours of Applied Music, and 6 hours of Music Theory courses.

2. *For the major in Music Theory.*—Twelve semester hours of Music Theory courses, 6 hours of Music History and Literature courses, and 6 hours of piano (other instrument or voice if departmental requirements for proficiency in piano are met).

3. *For the major in Applied Music.*—Twelve semester hours of Applied Music in field of specialization, senior recital, 6 hours of Music Theory courses, and 6 hours of Music History and Literature courses.

Master of Arts in the field of Musicology.—Prerequisite: a Bachelor's degree with a major in music, or an equivalent degree.

Required: the general requirements, pages 90–96. The program of study consists of (1) 24 semester hours of course work plus a thesis (equivalent to 6 semester hours), or (2) with the approval of the Department, 36 semester hours of course work without a thesis. All degree candidates are required to take 18 semester hours

of Music History and Literature or Music Theory courses and 6 hours of Applied Music. The thesis must demonstrate research ability in musicology.

Master of Music in the field of Music Theory, Music Composition, Conducting, or *Applied Music.*—Prerequisite: a Bachelor's degree with an undergraduate major in one of the following, at this University, or an equivalent degree: (1) Music History and Literature, (2) Music Theory, or (3) Applied Music.

Required: the general requirements, pages 90–96. The 30 semester hours of required second- and third-group course work including a thesis (299–300) are as follows:

1. *In the field of Music Theory.*—Eighteen semester hours of Music History and Literature and Music Theory courses, 6 hours of Applied Music, and a thesis demonstrating research ability in theoretical, creative, or analytical techniques.

2. *In the field of Music Composition.*—Eighteen semester hours of Music History and Literature and Music Theory courses, 6 hours of Applied Music, and a creative thesis of one composition in large form properly prepared for performance (chamber music, a symphonic form, or a choral work with orchestral accompaniment) including a written theoretical, formal, and harmonic analysis of the work.

3. *In the field of Conducting.*—Eighteen semester hours of Music History and Literature and Music Theory courses, 6 hours of Applied Music, and a thesis demonstrating research ability in theoretical, creative, or analytical techniques. The requirements also include an acceptable public conducting performance.

4. *In the field of Applied Music.*—Twelve semester hours of Applied Music in the area of concentration (piano, harpsichord, organ, voice, string or orchestral woodwind instrument), 12 hours of Music Theory and Music History and Literature courses. The thesis area consists of (1) a public recital or performance before a designated committee—such a recital or performance must be representative of an extensive and well-rounded repertory, performed on a professionally accepted artistic level, including verbal historical and analytical lecture notes on the musical content of the program; (2) demonstrated leadership in an ensemble performance (opera or oratorio for voice); and (3) a written report on some approved theoretical area related to the student's concentration.

Bachelor of Arts in Education with a teaching field in Music.—Prerequisite: the Education curriculum, pages 78–79.

Required: the Music option and professional courses listed on pages 112, 115.

MUSIC HISTORY AND LITERATURE

FIRST GROUP

3 **Introduction to Musical Understanding** (3) Steiner, Tilkens

Introductory history of musical styles, related to listening; elements and materials of music. (Fall and spring—day)

4 **Survey of Music Literature** (3) Steiner

Introductory study of musical forms, structures, and textures; aural analysis of selected literature. (Spring—day)

SECOND GROUP

103–4 **History of Music** (3–3) Tilkens

Development of music in the Western World from the early Christian Era to the present. (Academic year—day)

105 **Music of the Baroque Period** (3) Tilkens

Study of the musical styles, techniques, and literature from 1600 to 1750.

106 **Music of the Classic Period** (3) Tilkens
Study of styles, techniques, and literature from the 18th century schools through Haydn, Mozart, and Beethoven. (Spring—day)

107 **Music of the Romantic Period** (3) Mandel
Study of the musical styles, backgrounds, and literature from Schubert through the 19th century. (Fall—day)

108 **Music of the 20th Century** (3) Steiner
The principal schools, techniques, developments, and trends of the 20th century. (Spring—day)

109 **Orchestra Literature** (3) Steiner
Survey of the history and styles of orchestra literature, analysis of representative works.

110 **Chamber Music Literature** (3) Steiner
Survey of the history and styles of chamber music literature, analysis of representative works.

121 **The Opera** (3) Mandel
Survey of the history and styles of opera, analysis of representative works. (Spring—day)

125 **Keyboard Music Literature** (3) Tilkens
Survey of the history, style, and major content of the keyboard literature from the 16th century to the present. (Fall—day)

173 **Piano Pedagogy** (3) Tolson
Principles, materials, and methods of piano teaching. (Spring—day)

THIRD GROUP

203 **Bibliography and Research Methodology** (3) Mandel
(Spring—day)

209 **History of Musical Instruments** (3) Steiner

234 **Seminar: Performance Practices in Selected Areas** (3) Staff

238 **Seminar: Analytical Studies in Music History** (3) Parris
Topic for 1971–72: Bach. (Fall—day)

MUSIC THEORY

FIRST GROUP

1 **Elements of Music Theory** (3) Parris
Notation, scales, keys, intervals, terms, rhythms, ear-training, sight-singing, elementary keyboard harmony, melodic and harmonic dictation. (Fall and spring—day)

5–6 **Elementary Harmony** (3–3) Parris
Triads, inversions; chord analysis, construction, and progression; part-writing, modulations, figured bass. Prerequisite: Mus 1 or satisfactory passing of placement examination. (Academic year—day)

SECOND GROUP

131–32 **Advanced Harmony** (3–3) Parris
Practice in harmonic writing and analysis, realization of unfigured bass, altered chords, elementary 18th century counterpoint. Prerequisite: Mus 5–6 or equivalent. (Academic year—day)

135 **Counterpoint** (3) Parris
Study and practice of early contrapuntal techniques.

137 **Orchestration** (3) Parris
Instrumental scoring.

138 **Form and Analysis** (3) Parris
Analysis of musical forms in representative musical literature. (Spring —day)

151 **Conducting** (3) Steiner
Technique of conducting, score reading, rehearsal procedures, analysis, and interpretation of selected musical literature; practice in conducting. (Fall—day)

THIRD GROUP

231–32 **Composition** (3–3) Parris, Stephens
(Academic year)

235 **Advanced Counterpoint** (3) Parris

251 **Advanced Conducting** (3) Steiner
(Fall—day)

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

APPLIED MUSIC

All Applied Music courses may be repeated for credit. The supplementary fee is waived for full-time music majors. With the exception of Mus 51, 52, 53, and 54, one-semester hour courses are individual lessons of ½ hour a week—supplementary fee, $40; 2-, 3-, or 6-semester hour courses are individual lessons of 1 hour a week —supplementary fee, $80. Six-semester hour courses include lessons, supervised ensemble preparation, and required practice 15 hours a week. Mus 51, 52, 53, and 54 do not include individual lessons and carry no supplementary fee.

FIRST GROUP

Three hours of practice are required for each semester hour.

11 **Piano** (1) Tolson, McNabb, Russell, Peris
(Fall and spring)

12 **Piano** (2) Tolson, McNabb, Russell, Peris
(Fall and spring)

13 **Voice** (1) Gieseler, Prussing
(Fall and spring)

14 **Voice** (2) (Fall and spring)	Gieseler, Prussing
15 **Organ** (1) (Fall and spring)	Scribner, McNabb
16 **Organ** (2) (Fall and spring)	Scribner, McNabb
17 **Violin** (1) (Fall and spring)	Cochran, Parnas
18 **Violin** (2) (Fall and spring)	Cochran, Parnas
19 **Classical Guitar** (1) (Fall and spring)	Johns, Norris, Raffaelle, Scharf
20 **Classical Guitar** (2) (Fall and spring)	Johns, Norris, Raffaelle, Scharf
21 **Viola** (1) (Fall and spring)	Parnas
22 **Viola** (2) (Fall and spring)	Parnas
23 **Cello** (1) (Fall and spring)	Martin, Kirshbaum
24 **Cello** (2) (Fall and spring)	Martin, Kirshbaum
25 **Bass** (1) (Fall and spring)	Irvine
26 **Bass** (2) (Fall and spring)	Irvine
27 **Flute** (1) (Fall and spring)	Perazzoli
28 **Flute** (2) (Fall and spring)	Perazzoli
29 **Recorder** (1) (Fall and spring)	Huntington
30 **Recorder** (2) (Fall and spring)	Huntington
31 **Oboe** (1) (Fall and spring)	White
32 **Oboe** (2) (Fall and spring)	White

33 **Clarinet** (1) — Huntington
(Fall and spring)

34 **Clarinet** (2) — Huntington
(Fall and spring)

35 **Saxophone** (1) — Huntington
(Fall and spring)

36 **Saxophone** (2) — Huntington
(Fall and spring)

37 **Bassoon** (1) — Maciejewicz
(Fall and spring)

38 **Bassoon** (2) — Maciejewicz
(Fall and spring)

39 **French Horn** (1) — Ramsay
(Fall and spring)

40 **French Horn** (2) — Ramsay
(Fall and spring)

41 **Trumpet** (1) — Stephens
(Fall and spring)

42 **Trumpet** (2) — Stephens
(Fall and spring)

43 **Trombone** (1) — Kraft
(Fall and spring)

44 **Trombone** (2) — Kraft
(Fall and spring)

45 **Percussion** (1) — Wardlow
(Fall and spring)

46 **Percussion** (2) — Wardlow
(Fall and spring)

47 **Harp** (1) — Carman
(Fall and spring)

48 **Harp** (2) — Carman
(Fall and spring)

51 **Orchestra** (1) — Steiner
Preparation and performance of orchestral literature. Prerequisite: audition before Director. (Fall and spring—evening)

52 **Instrumental Ensemble** (2) — Steiner (Fall
Chamber ensemble groups in addition to orchestra participation. and spring)

53 **Chorus** (1) — Prussing
Preparation and performance of choral literature. Prerequisite: audition before Director. (Fall and spring—day)

54 **Chamber Choir** (2) — Prussing
Small vocal groups in addition to chorus participation. (Fall and spring—day)

SECOND GROUP

Prerequisite: audition to meet departmental requirements. Required practice: 5 hours a week for 1-semester hour courses, 10 hours a week for 2-semester hour courses, 12 hours a week for 3-semester hour courses.

111 **Piano** (1) — Tolson, Russell, Peris
(Fall and spring)

*112 **Piano** (2 or 3) — Tolson, Russell, Peris
(Fall and spring)

113 **Voice** (1) — Gieseler
(Fall and spring)

*114 **Voice** (2 or 3) — Gieseler
(Fall and spring)

115 **Organ** (1) — Scribner
(Fall and spring)

*116 **Organ** (2 or 3) — Scribner
(Fall and spring)

117 **Orchestral Instrument** (1) — Staff
(Fall and spring)

*118 **Orchestral Instrument** (2 or 3) — Staff
(Fall and spring)

119 **Classical Guitar** (1) — Staff
(Fall and spring)

*120 **Classical Guitar** (2 or 3) — Staff
(Fall and spring)

THIRD GROUP

211 **Piano** (3)
(Fall and spring)

212 **Piano** (6)
(Fall and spring)

213 **Voice** (3)
(Fall and spring)

*Only Music majors may elect 3 semester hours of credit.

214 **Voice** (6)
(Fall and spring)

215 **Organ** (3)
(Fall and spring)

216 **Organ** (6)
(Fall and spring)

217 **Orchestral Instrument** (3)
(Fall and spring)

218 **Orchestral Instrument** (6)
(Fall and spring)

Pathology

Professors T.M. Peery *(Chairman)*, F.N. Miller, Jr., William Newman, J.C. Smith
Clinical Professors L.E. Zimmerman *(Ophthalmic)*, J.M. Blumberg, E.B. Helwig *(Dermatologic)*, G.H. Reifenstein, N.S. Irey, Robert Sauer *(Comparative)*, Cornelia Hoch-Ligeti
Professorial Lecturers Mary Matthews, P.D. Olch *(History of Medicine)*
Associate Professors W.L. Marsh, Lois Platt *(Cytology)*, Alexander Breslow, F.S. Jannotta, M.S. Platt *(Pediatrics)*
Associate Clinical Professors V.E. Martens, R.E. Palmer, W.J. Jaffurs, M.A. Weinberger
Assistant Professors S.G. Kent, Suzanne Hammersberg *(Medical Technology)*, B.C. Zook *(Comparative)*
Assistant Clinical Professors W.F. Enos, Marjorie Williams, C.B. Cook, D.R. Parkinson, I.D. Godwin, Floris Garner *(Comparative)*, Gloria Brennan
Special Lecturer L.C. Johnson

Bachelor of Science in Medical Technology.—Prerequisite: the Medical Technology curriculum, page 78.

Required: the general requirements, pages 81–82, 85, including B Sc 111 and additional second-group Biological Sciences courses as recommended, see page 85; and Path 115–16, 117–18, 119–20, offered in the University Hospital.

Master of Science in the field of Pathology.—Prerequisite: a Doctor of Veterinary Medicine degree from a school recognized by the American Veterinary Medical Association.

Required: the general requirements, pages 90–96. The program of study consists of 31 semester hours of course work distributed as follows: (1) Path 201 (8 semester hours), 2 semester hours selected from any basic medical science courses, Path 283 (four months full-time in hospital-based clerkship for which the student receives 15 semester hours of credit); and (2) a thesis (6 semester hours based on a two-year training period in Veterinary Pathology. This training period may be taken at either the Armed Forces Institute of Pathology or the Office of Pathology, National Zoological Park, Smithsonian Institution.

Doctor of Philosophy in the field of Pathology.—Prerequisite: one of the following degrees from a recognized professional school: Doctor of Medicine (M.D.), Doctor of Veterinary Medicine (D.V.M.), or Doctor of Dentistry (D.D.S.).

Required: the general requirements, pages 90–94, 96–98, including 48 semester hours of approved graduate course work and a minimum of 24 semester hours of dissertation research. One year of residency in pathology at the University Hospital, equivalent to Path 283, may be counted for a maximum of 24 semester hours of graduate course work. Other experience must satisfy the eligibility requirements of the appropriate national certifying body, i.e., the American Board of Pathology in the case of the M.D., the American Board of Veterinary Pathology in the case of the D.V.M., and the American Board of Oral Pathology in the case of the D.D.S.

Research fields: Comparative Pathology, Human Pathology, Ophthalmic Pathology, and Veterinary Pathology

115–16 **Introduction to Medical Science** (1–1) — Marsh, Hammersberg, and Staff

Lectures on physiology, pathology, and medicine to accompany Path 119–20. For medical technology students only. (Academic year—1 hour a week)

117–18 **Principles in Medical Technology** (4–4) — Marsh, Hammersberg, and Staff

Theories, principles, sources of error of methods used in clinical chemistry, clinical bacteriology, serology, hematology, clinical microscopy. For medical technology students only. (Academic year—4 hours a week)

119–20 **Medical Technology Laboratory** (10–10) — Marsh, Hammersberg, and Staff

Rotation through University Hospital pathology laboratories: hematology and urinalysis, 12 weeks; chemistry, 12 weeks; bacteriology and parasitology, 12 weeks; blood bank, 6 weeks; serology, 4 weeks; tissue pathology, 4 weeks. For medical technology students only. (35 hours a week for 50 weeks)

*201 **Pathology** (8) — Staff

A general introduction to concepts of disease. Pathology of organ systems; correlation with symptoms and physical signs. Gross and microscopic study of diseased tissues. Case studies. (Fall—12 hours a weeks)

†205 **Comparative Pathology I** (3) — Zook

An introduction to the study of disease in vertebrates, and comparison with disease in man. Discussion of mechanisms by which various agents provoke illness and of body defensive reactions. Illustration of common diseases of various species, including material from captive wild animals. Recommended: courses in anatomy, histology, and physiology. (Fall—evening)

*266 **Comparative Pathology II** (1) — Sauer, Zook

Participation in an autopsy service involving wild animals in captivity, and comparison of diseases in various animal species with those in man. Limited to 4 students. Path. Lab., Nat'l. Zoological Park. (Fall—four 3-hour sessions)

*271 **Tissue Reactions to Drugs** (1) — Irey

Study of the problems involved in recognizing instances of untoward reaction to therapy. Case presentations. (Spring—1 hour a week)

* Open to limited number of graduate students, with permission.
† An interdepartmental course offered by the departments of Pathology and Biological Sciences.

*283 **Anatomical Pathology Clerkship** (5 to 30) Staff

Necropsy and surgical pathology service. Prerequisite: Path 201. Five semester hours of credit for each 4-week period. Students may receive up to 30 semester hours of credit for 6 months full-time. (Fall or spring)

295 **Comparative Pathology III** (5 to 30) Garner, Zook, Sauer

Participation in veterinary pathology service, including wild and domestic animals. Prerequisite: Path 201, 283. Armed Forces Inst. of Path. and/or Path. Lab., Nat'l. Zoological Park. (Fall or spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Pharmacology

Professors H.G. Mandel *(Chairman)*, V.H. Cohn, Jr., Paul Mazel, S.E. Fabro *(Research)*
Professorial Lecturers B.B. Brodie, F.E. Hahn
Associate Professors K.S. Kim *(Research)*, W.R. Jondorf *(Research)*, J.A. Straw
Assistant Professors Philip Klubes, Barbara Roth-Schechter
Special Lecturer D.J. Boullin

Master of Science in the field of Pharmacology.—Prerequisite: a Bachelor of Arts or Bachelor of Science degree. The undergraduate program must have included the following courses, or equivalent: B Sc 11–12; Phys 1, 2; Chem 11–12, 22, 51–52, 53–54. One year of calculus and a course in physical chemistry are normally recommended but may be taken during the work toward the Master's degree.

Required: the general requirements, pages 90–96, including Bioc 221–22; Phyl 201; Phar 201, 299–300. The remaining courses may be selected from Bioc 224, 227, 232, 241, 252, 260, 266; Chem 156, 251–52, 257; Micr 201, 225, 226, 230, 233, 257, 258; Phar 254, 256, 267, 269, 272, 279, 281, 282, 283.

Doctor of Philosophy in the field of Pharmacology.—Required: the general requirements, pages 90–94, 96–98.

Research fields: Biochemical Pharmacology, Chemotherapy and Molecular Pharmacology, Developmental Pharmacology, and Physiological Disposition of Drugs.

201 **Pharmacology** (8) Mandel and Staff

Lectures, laboratory, conferences on interaction of drugs and biological systems as a basis for rational therapy of disease. Prerequisite: biochemistry and physiology, or approval of Department. (Fall—day)

203 **Fundamental Principles of Pharmacology** (2) Staff

Basic principles of pharmacology, including drug receptor interactions, structure activity relationships, pharmacokinetics, membrane phenomena, cellular control mechanisms, drug toxicity. (Fall—day)

* Open to limited number of graduate students, with permission.

215 **Adolescent Drug Abuse: a Program for Educators** (3) — Cohn and Staff

Primarily for secondary school teachers, counselors, and administrators. Multidisciplinary lectures and discussions concerning the physiological and psychological effects of narcotics, central nervous system stimulants and depressants, alcohol, and hallucinogenic and psychedelic drugs; psychosocial factors leading to adolescent drug abuse; legal implications of drug abuse; prevention, control, and treatment of drug abuse.

252 **Seminar: Clinical Pharmacology** (2) — Fabro

Problems in therapeutics; emphasis on drugs used in treatment of cardiovascular and infectious diseases. Enrollment limited. (1971–72 and alternate years: spring—day)

254 **Frontiers in Pharmacology** (1) — Mandel and Staff

Recent advances and fields of research in pharmacology. Presentations by scientists from neighboring institutions. (Spring—day)

256 **Molecular Pharmacology** (2) — Hahn

Current theory on action of drugs, especially chemotherapeutic agents, at molecular level. Effect of drugs on biosynthetic processes of the cell with respect to DNA, messenger RNA, transfer RNA, ribosomes, protein, cell wall, and intermediary metabolites. Factors which alter action of drugs, such as drug interactions and resistance. (Spring—day)

258 **Cancer Chemotherapy** (1) — Mandel and Staff

Mechanisms by which drugs inhibit the growth of tumor cells. (1971–72 and alternate years: spring—day)

259 **Developmental Pharmacology** (1) — Fabro

Lectures, seminars, conferences. Teratogenic actions of drugs; pharmacological principles which apply during prenatal and perinatal development. (1971–72 and alternate years: spring—day)

260 **Endocrine Pharmacology** (1) — Kim

Lectures and seminars on recent advances in the pharmacology and mechanism of action of various hormones. (1972–73 and alternate years: spring—day)

267 **Pharmacological Research** (arr.) — Staff

Research with staff members. May be repeated once for credit toward a Master of Science degree. (Fall and spring—day)

269 **Pharmacology Seminar** (1) — Staff

Recent advances in pharmacology. Content differs each time the course is offered; may be repeated once for credit. (Fall and spring—day)

272 **Physiological Disposition of Drugs** (3) — Cohn

Fate of drugs in biological tissue. Absorption, distribution, chemical alteration, excretion of drugs; physical, chemical, and biological factors affecting these processes. Limited to 20 students. Prerequisite: Phar 201. (1971–72 and alternate years: spring—day)

275–76 **Advanced Topics in Pharmacology I–II** (1–1) — Staff

Lectures and seminars on advances in mechanisms of drug action; pharmacology of new drugs; theoretical aspects of pharmacology; laboratory techniques. (1971–72 and alternate years: academic year—day)

277–78 **Advanced Topics in Pharmacology III–IV** (1–1) Staff
Continuation of Phar 275–76. (1972–73 and alternate years: academic year—day)

279 **Special Topics in Pharmacology** (arr.) Staff
Selected aspects of drug action. Content differs each time the course is offered; may be repeated once for credit. (Fall and spring—day)

281 **Physiological Techniques in Pharmacology—Lecture** (2) Mazel, Straw
Physiological techniques for obtaining information on mechanism and site of action of pharmacological agents. Limited to 20 students. Phar 281 may be taken without 282. Prerequisite: Phar 201. (1971–72 and alternate years: spring—day)

282 **Physiological Techniques in Pharmacology—Laboratory** (2) Mazel, Straw
Accompanies Phar 281. Prerequisite: Phar 201. Prerequisite or concurrent registration: Phar 281. (1971–72 and alternate years: spring—day)

283 **Biochemical Techniques in Pharmacology** (arr.) Cohn
Lectures and laboratory. Theory and practice of modern biochemical techniques applicable to study of metabolic fate and mechanism of action of drugs. Prerequisite: Phar 201. (As arranged)

295 **Reading and Research** (arr.) Staff
Independent study for students preparing for the Master of Science degree. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Philosophy

Professors Thelma Z. Lavine *(Chairman)*, R.H. Schlagel
Associate Professors C.H. Pfuntner, W.B. Griffith
Associate Professorial Lecturer Laura Schrenk
Assistant Professor Gerald Donaldson

Bachelor of Arts with a major in Philosophy (Field-of-Study).—Prerequisite: the Arts and Letters curriculum, page 76.

Required: in addition to the general requirements, pages 81–85, the passing of the Philosophy major examination at the end of the senior year. The coordinated knowl-

edge upon which the student will be examined is the following: (1) History of Philosophy and (2) Problems of Philosophy.

Master of Arts in the field of Philosophy.—Prerequisite: a Bachelor's degree with an undergraduate major in Philosophy at this University, or an equivalent degree, as attested by passing this University's major examination in Philosophy. The undergraduate program should have included the following courses or their equivalent: Phil 111, 112, 113, 121, 131, and 152.

Required: the general requirements, pages 90–96. The program of study consists of (1) a minimum of 24 semester hours of second- and third-group courses plus a thesis (equivalent to 6 semester hours) or (2) 36 semester hours of approved second- and third-group courses without a thesis. A Master's Comprehensive Examination is required in two areas of philosophy: the History of Philosophy and Problems of Philosophy and Contemporary Philosophy.

FIRST GROUP

61–62 Introduction to Philosophy (3–3) — **Staff**

Problems of modern philosophy in relation to scientific and social developments since the Renaissance. Phil 61: theories of reality. Phil 62: theories of knowledge. Phil 61 or 62 may be taken independently. (Academic year—day and evening)

71 Philosophy and Literature (3) — **Lavine**

Philosophical foundations of psychoanalytical psychiatry, existentialism, and Marxism and their expression in literature, e.g., in the works of Mann, Kafka, Camus, Sartre, Malraux, Silone, and Koestler. (Spring—day)

SECOND GROUP

111 History of Ancient Philosophy (3) — **Donaldson**

History of Western philosophy from early Greece to the early Middle Ages. (Fall—day)

112 History of Modern Philosophy (3) — **Pfuntner**

History of Western philosophy of the 17th and 18th centuries (Descartes to Kant). (Spring—day)

113 19th Century Philosophy (3) — **Lavine**

European philosophy from Kant to Nietzsche. (Fall—day)

121 Introduction to Symbolic Logic (3) — **Griffith**

Systematic study of the principles of valid inference with attention to the development of skill in logical analysis and evaluation of arguments, and to the elementary theory of formal systems. (Fall—day)

***127 Theories of History (3)** — **Lavine**

Critiques of philosophies of history: idea of progress, historicism, Hegelian-Marxian dialectic, cyclical and social-scientific views. Contemporary problems of historical knowledge. (Fall—day)

131 Ethics (3) — **Griffith**

Theories of "the good" and "the right" from Plato to Sartre. (Spring—day)

* An interdepartmental course offered by the departments of Philosophy and History.

132 **Social Philosophy** (3) Lavine
Social philosophies from Luther to Marxism and Fascism. (Spring—day)

142 **Philosophy of Law** (3) Donaldson
Systematic examination of the fundamental concepts of law and jurisprudence; special emphasis on their treatment by contemporary philosophers and jurists. (Spring—evening)

151 **Myth, Science, and the Modern Mind** (3) Schlagel
A course in the philosophy of science. Comparison of the mythical and scientific outlook; emphasis on the development and nature of scientific concepts, methodology, and explanation from Copernicus to Einstein. (Fall—day)

152 **Knowledge, Truth, and Reality** (3) Schlagel
Inquiry into the basis and structure of knowledge, the problem of perception and independent reality, and the meaning and criteria of truth. (Spring—day)

162 **Aesthetics** (3) Pfuntner
Nature of aesthetic experience, problems of appreciation and criticism in the arts, and theories of artistic creation. Emphasis on contemporary arts and criticism. (Spring—evening)

172 **American Philosophy** (3) Pfuntner
Philosophies of Peirce, Royce, James, Dewey, and Santayana as representatives of American thought. (Fall—evening)

192 **Contemporary Philosophy: Analytical** (3) Schlagel
The two dominant movements of recent Anglo-American philosophy, logical positivism and British ordinary language philosophy, as represented by G.E. Moore, Wittgenstein, Ryle, Austin, Ayer, etc. (Fall—day)

193 **Contemporary Philosophy: Phenomenological** (3) Griffith
The phenomenological movement, including its development into German and French existentialism, and its more recent phases. (Spring—day)

THIRD GROUP

201–2 **Readings and Research** (3–3) Staff
Advanced readings and reports. Investigation of special problems. (Academic year)

210 **Seminar: Ancient Philosophy** (3) Donaldson
Content differs each time course is offered: may be repeated for credit. Topic for 1971–72: a study of the major works of Plato. (Spring—evening)

216 **Seminar: Kant** (3) Schlagel
Critique of Pure Reason. (1972–73 and alternate years: spring—evening)

221 **Seminar: Logical Theory** (3) Griffith
Metatheory of deductive systems, modal logics; historical and philosophical import of recent developments. (1972–73 and alternate years: fall—evening)

231 **Seminar: Ethical Theory** (3) Griffith
Readings in recent ethical philosophy. (Fall—evening)

251 **Seminar: Philosophy of Science** (3) Schlagel
Intensive study of selected problems in the historical and theoretical foundations of science. (Spring—evening)

252 **Seminar: Epistemology** (3) Schlagel
Study of selected problems.

262 **Seminar: Aesthetics** (3) Pfuntner
Study of selected problems.

272 **Seminar: American Philosophy** (3) Pfuntner
Important American contributions to theories of the self, society, and history. (1971–72 and alternate years: fall—evening)

280 **Seminar: Philosophy of History** (3) Lavine
Current issues concerning the problem of historical knowledge.

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

Physical Education

Professors Elizabeth Burtner *(Emeritus)*, R.G. Hanken, V.J. DeAngelis, Loretta Stallings, J.L. Breen *(Chairman)*
Professorial Lecturers W.D. Thompson, R.B. Castell, Donald Hawkins, Margie Hanson, J.P. Naughton
Associate Professors Lyndale George, Jeanne Snodgrass, Maida Withers
Associate Professorial Lecturer Evelyn DeBoeck
Assistant Professors Gayle Clapp, Honey Nashman, Nancy Johnson, B.P. Berube, Mabel McEwan, Judith Young
Assistant Professorial Lecturers Martha Jesnak, Barbara Katz, S.G. Pitts
Instructors K.E. Bumgarner, Linda Woolsey
Lecturer Calva Collier

Programs of study leading to the degrees of *Bachelor of Science in Physical Education* (opportunity for specialization in elementary and secondary school physical education or dance), *Master of Arts in Education* (field in Physical Education with opportunity for specialization in dance, elementary and secondary school physical education, driver safety education, or special physical education) are offered by the School of Education (see pages 101–25).

This Department includes all the recognized sport activities of University students except intercollegiate athletics for men.

Four semesters of Physical Education (PE 4, 5, or 6) are required for graduation, except for those students exempt under the regulations stated on pages 74–75.

A medical examination is required before participation in physical education activities.

The University is not responsible for injuries received in intramural games or in any of the activities of the Department of Physical Education, and the student assumes full responsibility therefor.

Courses with titles followed by the parenthetical designation (men) are available to men students only; those with titles followed by the parenthetical designation (women) are available to women students only.

FIRST GROUP

*4 **Physical Education Activities** (1) Staff

A minimum of 24 clock hours of instruction required each semester. May be repeated for credit not to exceed 4 semester hours. (Fall and spring—day)

*5 **Physical Education Activities** (1) (men) Staff

A minimum of 24 clock hours of instruction required each semester. May be repeated for credit not to exceed 4 semester hours. (Fall and spring—day)

*6 **Physical Education Activities** (1) (women) Staff

A minimum of 24 clock hours of instruction required each semester. May be repeated for credit not to exceed 4 semester hours. (Fall and spring—day)

57 **Dance Technique I** (1) Staff

Intermediate technique in modern dance. (Fall)

58 **Dance Technique II** (1) Staff

Advanced technique in modern dance. (Fall)

SECOND GROUP

101 **Physical Education in the Elementary School** (3) Snodgrass

For Elementary Education and Physical Education majors. Implications of child growth and development for school and playground programs: philosophy, curriculum, techniques of teaching, facilities and equipment, evaluation. (Fall—evening)

102 **Physical Education Curriculum in the Elementary School** (3) Staff

Curriculum for kindergarten and grades 1–6 in physical education activities. Prerequisite: PE 101. (Spring—evening)

105 **Special Physical Education** (3) Nashman

Corrective, developmental, and adapted physical education for the handicapped—orthopaedic, neurological, cardiovascular, and mentally retarded. Clinical experience. (Spring—evening)

107 **Teaching Ethnic Dance** (1 or 2) Johnson

Methods and materials for teaching the folk and social forms of dance. (Fall—day)

108 **Dance Improvisation** (1) Staff

Awareness of the body, environment, group dynamics, performance, and composition through improvisational technique. (Fall—day)

109 **Dance Composition I** (1 or 2) Withers

Basic elements and principles of composition. (Fall—day)

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* A Physical Education fee of $4.50 a semester is required for registration in one or more of the activity courses.

Students whose medical examinations indicate the desirability for remedial or restricted activity are assigned to programs especially adapted to their needs

110 **Dance Composition II** (1) Withers

Advanced problems in composition. May be repeated once for credit. (Spring—day)

111–12 **Sports Education Technique I-II** (3–3) Staff

Techniques for teaching individual, dual, and team sports. (Academic year—day)

113–14 **Field Experience: Practicum in Physical Education** (3–3) Staff

(Formerly Practice in Teaching Physical Education Activities)

Pre-practice teaching in elementary or secondary school physical education and special physical education. Observations and seminars relating to field experiences. (1972–73 and alternate years: academic year—day)

117 **Teaching Modern Dance** (2 or 3) Staff

Methods of teaching modern dance: technique, improvisation, and composition. Analysis of accompaniment. Secondary, college, adult levels. (1972–73 and alternate years: fall—evening)

119 **Creative Dance for Children** (3) Withers

Study of dance as an expressive medium for children; emphasis on concepts and principles, methods and materials. Consideration given to dance for children with special education problems. (Fall—day)

120 **Repertory** (1) Withers

Study and performance of dance works. Admission by permission of instructor. May be repeated three times for credit. (Fall and spring—day)

122 **Methods and Materials for Health Education** (3) Stallings

Curriculum planning and organization, methodology, selection and use of materials, evaluation, basic health knowledge. (Spring—day)

123 **Advanced Dance Techniques** (1) Staff

Ballet and modern dance. May be repeated once for credit. (Fall and spring—day)

129 **Perceptual and Conceptual Learning** (3) Stallings

Theories of motor development and their application to teaching movement skills and sport skills.

130 **Motor Performance in Childhood** (3) Staff

Study of the evolvement and refinement of fundamental movement skills. (1971–72 and alternate years: spring—evening)

134 **Rhythmic Analysis through Creative Movement** (3) DeBoeck

Pulse, meter, phrase, simple music notation, and analysis of elementary forms of music composition. Sensory and ideational stimuli, music, poetry, and the visual arts as motivation for improvisation and choreography. Prerequisite: Mus 3, one semester of modern dance or ballet; or equivalent. (1971–72 and alternate years: spring—day)

135–36 **Survey of Dance History** (3–3) Staff

Dance from primitive ritual to contemporary folk, art, and ethnic forms. Practical work in dance included. PE 135: prehistoric to 20th century. PE 136: 20th century. (1971–72 and alternate years: academic year—evening)

137 **Dance Notation** (3) Katz

Study of Labanotation; leads to elementary certification. (1971–72 and alternate years: spring—day)

138 **History, Principles, Organization, and Administration of Physical Education** (3) George

(Formerly Philosophy and Organization of Physical Education)

Nature and function of administration and organization in physical education. Professional associations, ethics, and curriculum content. (Fall—day)

139 **Teacher Behavior** (3) Breen

Laboratory assignments for experience in teaching; study of individual differences and the nature and interrelationships of psychological traits and differences; teacher behavior analyzed in relation to motives, attitudes, and expectations. Integration of structure, psychological processes, and behavior emphasized for a more thorough understanding of the adjustment processes.

141–42 **Dance Production** (2–2) Staff

(Replaces former PE 118 Dance Production (2 or 3))

Planning, choreographing, and staging of dance: demonstration, concerts, musicals, plays, festivals. Design and execution: lighting, costuming, sets, make-up. Crew work; accompaniment for dance. (1972–73 and alternate years: academic year—evening)

144 **Choreography** (2) Staff

Solo and group. (Fall and spring)

149 **Anatomy and Kinesiology** (3) Stallings

Study of the structure of the human body and analysis of human movement, including neuromuscular mechanisms, cardivascular system, and mechanical physics. (Spring)

157 **Dance Technique and Theory** (1) Withers

Theories of movement; analysis and practice of contemporary dance techniques. (Spring—day)

158 **Safety Education** (3) DeAngelis

Liability, prevention, and emergency care of all types of injuries with reference to first aid and athletics. Proper use of personnel, facilities, and equipment. (Fall—evening)

164 **Physiology of Exercise** (3) Berube

The physiological functions of the body and the effect of exercise on these functions. Prerequisite: PE 149. (Spring—evening)

THIRD GROUP

201 **Philosophy and Organization of Physical Education** (3) Breen

Concepts of philosophy and philosophic method applied to objectives, principles, and practice in physical education. (Fall—evening)

202 **Motor Learning** (3) Stallings

Theories of motor development and learning; variables of motor performance and learning with implications for teaching movement skills. (Spring—evening)

211 **Problems and Modern Trends in Physical Education** (3) Hanken

Lecture (2 hours), conference (1 hour). For experienced teachers. Organization, supervision, and curriculum problems growing out of current issues; program planning policies; competition.

220 **Problems in Health Education** (3) Stallings

Lecture (2 hours), conference (1 hour). Health needs, policies and program planning, use of community resources, promising practices in the field. (Fall—evening)

230 **Movement Analysis** (3) Staff

Scientific analysis of fundamental movement and sports skills. (1972–73 and alternate years: fall)

232 **Current Issues in Elementary School Physical Education** (3) Hanson

Current philosophy, trends, and research; implications for curriculum, instruction, evaluation. (Spring—evening)

234 **Organization and Administration of Elementary School Physical Education** (3) George, Snodgrass

For school administrators, supervisors, principals, and physical education specialists. Curriculum, administrative, and supervisory problems; kindergarten, grades 1–6. (1972–73 and alternate years: spring—evening)

241 **Physical Examinations and Correctives** (3) Nashman

Examination for detection of postural defects, faulty body mechanics, and physical fitness; exercise prescription. Clinical experience. Prerequisite: PE 105 or equivalent. (Spring—evening)

242 **Environment, Leisure, and the Quality of Life** (3) Hawkins

(Formerly Recreation for Special Groups)

A seminar focusing on evironmental problems and ecological planning and their impact on man's total physical and cultural development. The course encompasses normal population as well as handicapped and other special groups. (Fall—evening)

250 **Recreation and Outdoor Education** (3) Thompson

Lecture (2 hours), conference (1 hour). Current trends in philosophy, principles, practices, and programs for outdoor education, camping, and community-school relationships. (Fall—evening)

256 **Sports Medicine** (3) Naughton

Theory and practice of therapeutic exercise as it applies to physical rehabilitation of the physically handicapped; sports injuries; preventive, adapted, and remedial concepts; teachers' and coaches' role as related to ancillary medical focus; research in injury prevention and the use of food and vitamin supplements as an ergogenetic process. (Spring)

258 **Safety Education—Care and Prevention** (3) Staff

Offered only by the College of General Studies in off-campus centers. Care and prevention of athletic injuries, school safety, first aid, and liability. Leads to Instructor Certification in First Aid.

261 Driver and Safety Education I (3) Pitts

History, scope, objectives. Automobile construction and maintenance, traffic accidents, laws, regulations, sound driving practices, responsibilities, and liabilities; emphasis on practice driving laboratory experiences. (Fall—evening)

262 Driver and Safety Education II (3) Pitts

Methods and techniques of conducting programs, pupil and program evaluation, research, planning, organization and instruction in modern approaches, laboratory and direct experiences in the utilization of multiple car and simulator approaches to instruction. (Spring—evening)

263 Basic Simulation—Driver Education (3) Pitts

Offered only by the College of General Studies in off-campus centers. Orientation and psychological foundations of simulator instruction. Operation, care, and preventive maintenance; organization and administration of a driver education simulator program.

264 Safety Education (3) Castell

Extraneous influences that cause vehicular accidents—such as alcohol, drugs, suicidal tendencies, emotional and psychological factors, medical reasons—and their effects upon driver safety. (Spring—evening)

265 Driver and Safety Education III (3) Pitts

Modern methods and materials in traffic safety and driver education; psychological testing; Drivucator; multiple-car method.

270 Philosophy of Dance (3) Staff

Study of the theories and concepts underlying dance from the 18th century to the present. (1972–73 and alternate years: fall—evening)

271–72 Dance Notation (3–3) Katz

Study of Labanotation. Special project: study and reconstruction of notated works of 20th century choreographers of American modern dance. PE 271: leads to intermediate certification; effort-shape notation included. PE 272: intermediate-advanced level. (1971–72 and alternate years: academic year—day)

273 Advanced Choreography (3) Burtner

Advanced problems in creative movement and composition. Choreographing of group and solo works in dance. May be repeated once for credit. (Fall and spring)

277 Dance Expressions in Selected Cultures (3 or 6) Burtner

Study of ethnic forms of dance through reading and participation. Study may be done in the United States or the country of the dance being studied. (Fall and spring)

297 Advanced Topical Studies (3) Staff

Independent study or field project pertinent to the needs of the student, including synthesis and critique of background literature. Prerequisite: Educ 295 or permission of instructor. May be repeated once for credit. (Fall and spring)

Physical Science

See "Chemistry."

Physics

Professors G.M. Koehl, Herbert Jehle, H.H. Hobbs, Julian Eisenstein *(Chairman)*, Otto Bergmann, A.J. Zuchelli, Francisco Prats
Professorial Lecturer Herbert Rabin
Associate Professorial Lecturer H.H. Landon, Jr.
Assistant Professors Margaret Montzka, J.M. Harrison, N.K. Khatcheressian, W.C. Parke, M.F. Taragin

Bachelor of Arts or *Bachelor of Science with a major in Physics (Departmental).*—Prerequisite: the Arts and Letters or the Science curriculum, respectively, pages 76–77, including Phys 1, 2, 31–32, 51–52; Chem 11–12; Math 31, 32, and 33.

Required: the general requirements, pages 81–85, including (1) Phys 151 or 152, 161, and 165; (2) 12 semester hours of intermediate Physics courses, to be selected with the approval of the departmental adviser; (3) 6 semester hours selected from Math 111, 112, 124, 134, 139, 140, 142; (4) Stat 97 or EE 51.

Master of Arts in the field of Physics.—Prerequisite: a Bachelor's degree with a major in Physics at this University, or an equivalent degree.

Required: the general requirements, pages 90–96, including Phys 231, 232, 233–34, 235, 236, 291, 299–300, plus *one* of the following: Phys 241, 242, 243, 244, 245, or 251–52.

Doctor of Philosophy in the field of Physics.—Required: the general requirements, pages 90–94, 96–98.

Research fields: Experimental Solid State Physics (Behavior of Electrons in Solids, Growth and Perfection of Crystals, Magnetic Properties of Solids at Low Temperatures, Mössbauer Effect), and Theoretical Physics (Biophysics, Elementary Particles, Field Theory, General Relativity, Magnetic and Optical Properties of Solids, Molecular Structure, Nuclear Scattering, Quantum Mechanics).

Doctor of Philosophy in the field of Biophysics (an interdepartmental field offered by the departments of Biological Sciences, Physics, and Physiology, see pages 218–21). See pages 90–94, 96–98, for requirements for the degree.

Bachelor of Arts in Education with a teaching field in Physics.—Prerequisite: the Education curriculum, pages 78–79.

Required: the Physics option and the professional courses listed on pages 112, 115.

Departmental prerequisite: Phys 31–32 or equivalent, and consent of a departmental adviser, are prerequisite to all second-group courses in Physics.

ASTRONOMY

FIRST GROUP

9–10 **Introduction to Astronomy** (3–3) **Staff**

Lecture (2 hours), recitation (1 hour), laboratory (2 hours). Classical through modern astronomy with introduction to basic principles underlying astronomical systems and observations. Primarily for nonscience majors. Laboratory fee, $11 a semester. (Academic year—day)

*11–12 **Introduction to Astronomy** (2–2) Staff

Same as Phys 9–10 without the laboratory. (Academic year—day and evening)

PHYSICS

FIRST GROUP

1 **General Physics** (4) Staff

Topics in classical physics which form a foundation for modern physics. Prerequisite: two years of college preparatory mathematics or concurrent registration for Math 6. Laboratory fee, $11. (Fall—day and evening; spring—day)

2 **Introduction to Modern Physics** (4) Staff

Selected topics in modern physics, including electromagnetic phenomena. Prerequisite: Phys 1 or equivalent. Phys 1 may be waived on the basis of the College Entrance Examination Board Achievement Test or Advanced Placement Examination or by a departmental examination prior to registration. Laboratory fee, $11. (Fall—day; spring—day and evening)

†3 **General Physics** (3) Staff

Same as Phys 1 without laboratory. (Fall—day and evening; spring—day)

‡4 **Introduction to Modern Physics** (3) Staff

Same as Phys 2 without laboratory. (Fall—day; spring—day and evening)

5 **Topics in Contemporary Physics** (3) Staff

Discussion of current developments based on recent *Scientific American* articles in the physical sciences. Topics include relativity, quantum theory, elementary particles, lasers, Mössbauer effect, etc. Prerequisite: high school physics and two years of college preparatory mathematics.

7 **Ideas of Physics—History and Analysis** (3) Staff

The development of atomic theory and corresponding views of space and time are discussed. Physical phenomena which were relevant to the evolution of the atomic theory are treated in historical perspective. Special attention is given to the liaison of physics with mathematics and technology. Prerequisite: high school algebra.

31–32 **Introduction to Theoretical Physics** (2–2) Staff

Theoretical structure of physics, emphasis on appropriate analytical techniques. Prerequisite: two semesters of calculus and Phys 2. (Academic year—day and evening)

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* This course does not satisfy the Columbian College of Arts and Sciences science requirement. This course may not be taken by students who have completed, or are enrolled in, or plan to enroll in Phys 9–10.

† This course does not satisfy the Columbian College of Arts and Sciences science requirement. This course may not be taken by students who have completed, or are enrolled in, or plan to enroll in Phys 1.

‡ This course does not satisfy the Columbian College of Arts and Sciences science requirement. This course may not be taken by students who have completed, or are enrolled in, or plan to enroll in Phys 2.

51–52 **Introduction to Experimental Physics** (2–2) **Staff**

Experiments and lectures on the basic phenomena of physics and techniques of experimentation. Prerequisite: Phys 2 and two semesters of calculus. Laboratory fee, $11 a semester. (Academic year—day and evening)

SECOND GROUP

151–52 **Intermediate Laboratory** (2–2) **Staff**

Independent advanced work to introduce students to laboratory and shop techniques and the use of specialized instruments. Prerequisite: Phys 51–52. Laboratory fee, $11 a semester. (Academic year—day)

161 **Mechanics I** (3) **Staff**

Mechanics of mass points and rigid bodies. Newton's laws, conservation laws, Euler's equations, inertia tensor, small vibrations, and elements of Lagrange's and Hamilton's equations. (Fall—day)

162 **Mechanics II** (3) **Staff**

Basic aspects of elasticity and fluid dynamics, strain tensor, stress tensor, equations of equilibrium, elastic waves, ideal and viscous fluids. (Spring—day)

163 **Optics** (3) **Staff**

Oscillations and waves, energy and momentum of the electromagnetic field, interference, diffraction, geometrical optics, optics of crystals and other media, dispersion. (Fall—day)

164 **Thermodynamics** (3) **Staff**

Basic principles of thermodynamics, reversible changes, applications to simple systems, thermodynamic potentials, phase equilibrium. (Spring)

165–66 **Electromagnetic Theory** (3–3) **Staff**

Development of Maxwell's field equations using vector and tensor calculus, electrostatics, stationary and nonstationary phenomena, basic circuit theory, electromagnetic waves and radiation. (Academic year—day)

167 **Principles of Quantum Physics** (3) **Staff**

Experimental background and theoretical basis of quantum mechanics. (Fall—evening)

168 **Applied Quantum Physics** (3) **Staff**

Applications of quantum mechanics to statistical mechanics and to atomic, molecular, and nuclear physics. (Spring—evening)

170 **Elementary Solid State Physics** (3) **Staff**

Dielectric and magnetic properties of solids, behavior of electrons in metals and semi-conductors, lattice defects. (Spring—evening)

172 **Biophysics** (3) **Jehle**

Biosynthesis of macromolecules: physical basis of nucleic acid replication, transcription, and translation; information theory. Specificity of interaction of cells in reaggregation and morphogenesis. Symmetry in biological organization. (Fall—day)

175 Nuclear Physics (3) Staff

Structure and stability of atomic nuclei, nuclear transformations and reactions, radiations of nuclei, fission. (1972–73 and alternate years: fall)

THIRD GROUP

Consent of a departmental graduate adviser is required for admission to all third-group courses in Physics.

231 Electromagnetic Theory: Macroscopic Effects (3) Staff

Aspects of electromagnetism having to do with fields in the vacuum and in media, their determination in terms of physical boundary conditions and their effects upon charges and matter; definition of field quantities, experimental field relations, solutions for the fields, effects of dielectrics and magnetic media, time-dependent solutions, and basic aspects of optics. (Fall—day)

232 Advanced Mechanics (3) Staff

Analytic methods of mechanics as a basis for modern theory: variational principles, Lagrange's equations, Hamiltonian formulation, canonical transformations, classical perturbation theory, transition to continuum. (Fall—day)

233–34 Quantum Mechanics (3–3) Staff

General aspects of quantum mechanics with emphasis upon the developmental principles involved. Operators, representations and transformation theory, Schrodinger and Heisenberg pictures, angular momentum, perturbation theory, scattering theory. (Academic year—evening)

235 Special Relativity (3) Staff

Application of relativistic concepts to the basic fields of physics: space and time, tensors and covariant mechanics of point particles, covariant form of electromagnetism, relativistic variational principles, relativistic quantum equations. (1971–72 and alternate years: fall—day)

236 Electromagnetic Theory: Electrodynamics and Radiative Effects (3) Staff

Lienard-Wiechert potentials, multipole fields, covariant methods, the self-field problem, and classical radiation theory. (Spring—day)

241 Statistical Mechanics (3) Staff

Study of atomic configurations under thermodynamic conditions by use of partition functions and cluster expansion techniques; ideal and nonideal gases; electron plasmas; changes of state. (Spring)

242 Atomic and Molecular Structure (3) Staff

Structure of atoms and molecules, energy levels, binding energy, optical activity. Hartree and Hartree-Fock equations, spin-effects, rotational and vibrational effects, paramagnetic resonance, chemical binding. (1972–73 and alternate years: spring)

243 Solid State Physics: Structure and Binding (3) Staff

Atomic structure of solids and analysis of the binding of crystals. Crystalline forms and symmetries, atomic vibrations and specific heats, sound and optical propagation, crystalline defects. (1971–72 and alternate years: fall—evening)

244 **Solid State Physics: Electronic Processes in Metals** (3) **Staff**

Phenomena in metals and semi-conductors determined by the electronic states allowed: binding, specific heats, magnetic properties, transport phenomena. Independent particle approximation and many-body aspects are discussed. (1971–72 and alternate years: spring—evening)

245 **Quantum Electrodynamics: Theory and Applications** (3) **Staff**

A presentation of the lower order effects depending upon the quantal nature of the electromagnetic field: Hamiltonian formulation and field quantization, perturbation calculations, Compton effect, photoelectric effect, electron-electron scattering, pair creation and annihilation, indices of refraction, divergence difficulties. (1972–73 and alternate years: fall)

246 **Quantum Field Theory** (3) **Staff**

Covariant presentation of general theory of quantized fields, Boson and Fermion fields, theory of S-matrix, dispersion relations, and renormalization program. (1972–73 and alternate years: spring)

247 **Nuclear Theory** (3) **Staff**

Nuclear interactions, nuclear models, theory of nuclear reactions, pion physics and weak interactions. (1971–72 and alternate years: spring)

248 **Elementary Particles** (3) **Staff**

Scalar, vector, and spinor fields and their particle aspects; weak and strong interactions; symmetry properties and conservation laws. (1971–72 and alternate years: spring)

249 **Statistical Processes** (3) **Staff**

Extension of statistical concepts to irreversible processes. Ergodic behavior, classical and quantum approaches to irreversible effects in large systems, master equations, recurrence paradox and development of thermodynamic concepts. (1972–73 and alternate years: fall)

250 **Selected Topics in Modern Physics** (3) **Staff**

Complements the established curriculum by affording formal instruction in topics of immediate interest to the development of physics and in particular to the members of the graduate research group. May be repeated for credit with permission of graduate adviser. (Fall and spring)

251–52 **Laboratory** (3–3) **Staff**

Individual work on special topics. Laboratory fee, $11 a semester. (Academic year)

254 **General Theory of Relativity** (3) **Staff**

Physical principles and mathematical methods underlying Einstein's field equation, geodesic equations of motion, checks of the theory, action principle, conservation laws, perturbation theory, gravitational radiation theory, relativistic cosmology. (1971–72 and alternate years: spring)

291 **Seminar** (1) **Staff**

Individual investigation of special problems. All students registered for a Master's degree in physics are expected to attend this seminar during residence for the degree, and to take part in its programs. Credit for participation in the seminar work is obtained during the last two semesters of residence; this credit, however, is based upon the seminar work during the entire period of residence. May be repeated once for credit. (Fall and spring—day)

299–300 Thesis Research (3–3) Staff
(Fall and spring)

FOURTH GROUP

398 Advanced Reading and Research (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 Dissertation Research (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Physiology

Professors C.S. Tidball, R.A. Kenney *(Acting Chairman)*, Elizabeth Tidball
Professorial Lecturer Leonard Laster
Associate Professors Marie Cassidy, M.J. Jackson
Assistant Professors R.A. Lavine, D.W. Watkins
Special Lecturers L.L. Langley, H.J. Zimmerman

Master of Science in the field of Physiology.—Prerequisite: a Bachelor's degree. No major is specified, but the undergraduate program must have included the following courses or equivalent: B Sc 11–12; Chem 11–12, 22, 51–52, 53–54; Math 31; Phys 1, 2.

Required: the general requirements, pages 90–96. In addition to the thesis, the 30 hours of required work should include Phyl 201, 221, 298, and at least 3 semester hours of research (Phyl 295).

Doctor of Philosophy in the field of Physiology.—Required: the general requirements, pages 90–94, 96–98. The program of study includes a major field in Physiology, a subfield (see below) in Physiology, and a minor field outside of Physiology leading to the Cumulative Examination. The 48 semester hours of required course work leading to the Cumulative Examination should include Bioc 221–22; Phyl 201, 221, 298, 396, 398; and a minimum of 8 semester hours each in two areas outside of Physiology in addition to the minor field.

Research fields and areas of study: Applied Physiology, Cardiovascular Physiology, Cellular Physiology, Endocrine Physiology, Gastrointestinal Physiology, Neurophysiology, Renal Physiology, and Respiratory Physiology.

Doctor of Philosophy in the field of Biophysics (an interdepartment field offered by the departments of Biological Sciences, Physics, and Physiology), see pages 218–21. See pages 90–94, 96–98, for requirements for the degree.

Departmental prerequisite: Phyl 201 or equivalent is prerequisite to all courses in Physiology numbered above 201.

191 Selected Topics in Human Structure and Function (3) Kenney
Lecture (2 hours), laboratory (1 hour). Structural and functional basis of physiology. A required course for graduate students who have not had Anat 201 or equivalent. Content of this course is on the undergraduate level; students may receive graduate credit on completion of additional work as prescribed by the instructor. Prerequisite: B Sc 11–12 or equivalent and consent of instructor. Open to Columbian College of Arts

and Sciences students only with the approval of the student's major adviser. (Fall—day)

201 **Physiology** (8) **Staff**

Lecture (8 hours), laboratory (2 hours), conference (1 hour). Cellular, organ system, and applied mammalian physiology. Prerequisite for graduate students: Anat 201 or Phyl 191, or equivalent; Bioc 201 or 221–22 (Bioc 222 may be taken concurrently); or consent of Chairman of Department. Open to Consortium students only with permission of Department Chairman. (Spring—day)

221 **Seminar** (1) **Jackson**

Staff and student presentations from literature. Present work discussed, experimental design and scientific deduction evaluated. Topics to be announced. Prerequisite: a reading knowledge of French or German. Content differs each time the course is offered; may be repeated for credit. (Fall and spring—day)

251 **History of Medicine** (1) **E. Tidball**

Survey of the great contributors to physiology and medicine in the context of the times in which they lived and worked. (Fall—day)

252 **Physiological Basis of Sexuality** (1) **C. Tidball**

Conference 1 hour a week. Human reproduction, neonatal changes, contraception, sterility; their implications on patient counseling. (Fall—day)

253 **Clinical Applications of Physiology** (2) C. Tidball

Emphasis on acid-base and fluid-balance physiology and its relation to clinical problems.

261 **Gastrointestinal Physiology** (2) **Staff**

Lecture or conference 2 hours a week. Physiological approach to such clinical problems as peptic ulcer, malabsorption, ulcerative colitis, hepatitis, and others. (Fall—day)

262 **Cardiovascular Physiology** (2) **Kenney**

Lecture or conference 2 hours a week. An overview of cardiovascular physiology at an advanced level.

264 **Basic Science in Clinical Medicine** (2) **Laster**

Conferences on basic and clinical research which have brought new understanding to disease states characterized by inborn errors of metabolism. (Fall—day)

265 **Review of Endocrinology** (1) **Jackson**

(Phyl 266 and 265 replace former Phyl 263 Endocrine Physiology (2))

Review of basic endocrinology. (Fall—day)

266 **Advanced Endocrinology** (2) Jackson

(Phyl 266 and 265 replace former Phyl 263 Endocrine Physiology (2))

Review at an advanced level of selected topics in endocrinology and metabolism. Concurrent registration in Phyl 265 required. (Fall—day)

267 **Renal Physiology** (2) **Kenney**

Lecture or conference 2 hours a week. An overview of renal physiology at an advanced level.

269 **Neurophysiology and Control Mechanisms** (2) Lavine

Selected topics in contemporary neurophysiology, including methods of data collection and analysis, control mechanisms involved in movement and behavior, and sensory processing. Open to students in Medical Engineering with permission of instructor. (Fall—day)

270 **Electron Microscopy in Cellular Physiology** (1) Cassidy

Introduction to the applications of electron microscopy in the investigation of cellular physiology. (Fall—day)

273 **Investigative Electron Microscopy** (2) Cassidy

Lecture (2 hours), laboratory as arranged. Application of electron microscopy to biological investigative studies. Limited enrollment. Prerequisite: Anat 261 or equivalent. Admission by permission of instructor. (Fall—day)

295 **Research** (arr.) Staff

By special arrangement with individual Staff members. Approximately 4 clock hours in the laboratory for each semester hour credit. Content differs each time course is offered; may be repeated for credit. (Fall and spring—day)

298 **Comprehensive Physiology** (2) Staff

Guided review of selected areas of Physiology appropriate to the student's graduate program. This course satisfies the requirements for the Master's Comprehensive Examination, the Field Examination for doctoral students minoring in Physiology, and Part I of the Cumulative General Examination in Physiology. Prerequisite or concurrent registration: Phyl 221. (Fall—day)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

396 **Advanced Reading and Research** (2) Staff

Limited to students preparing for the Doctor of Philosophy general examination. Tutorial literature survey of a subfield of Physiology and of pertinent areas of the candidate's minor field. This course satisfies the requirement for Part II of the Cumulative General Examination in Physiology. (Fall and spring)

398 **Development of Dissertation Problem** (2) Staff

Limited to students preparing for the Doctor of Philosophy general examination. Preparation for written and oral presentation of dissertation problem. This course satisfies the requirement for Part III of the Cumulative General Examination in Physiology. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Political Science

Professors J.W. Brewer, W.H. Kraus, R.E. Purcell, H.M. Stout, H.L. LeBlanc *(Chairman)*, Benjamin Nimer, H.C. Hinton, Andrew Gyorgy, B.M. Sapin

Professorial Lecturer Bernard Gordon
Associate Professors J.A. Morgan, Jr., C.F. Elliott, Bernard Reich, Young Kim, C.A. Linden
Adjunct Associate Professor Donald Robinson
Assistant Professors S.J. Wayne, J.M. Logsdon
Assistant Professorial Lecturer J.D. Stempel
Instructors K.L. Storrs, S.W. Burks

Bachelor of Arts with a major in Political Science (Departmental).—Prerequisite: the Arts and Letters curriculum, page 76, including P Sc 5–6 and Stat 51 or 53.

Required: in addition to the general requirements, pages 81–85, 30 semester hours of Political Science courses including P Sc 105 and 6 semester hours from each of Groups A, B, C, and D, listed below. The 6 semester hours selected from Group A must include P Sc 117 or 118; the 6 semester hours from Group B must include P Sc 103 or 104 or 122 or 145; the 6 semester hours from Group C must include P Sc 111 or 112; the 6 semester hours from Group D must include P Sc 171 or 181 or 182.

Group A: Political Theory, History of Political Thought, and Methodology—P Sc 107, 117–18, 119–20, 141, 160, 198; *Group B:* American Government and Politics—P Sc 103–4, 108, 121–22, 125, 126, 145, 146, 151, 167, 199; *Group C:* Comparative and Foreign Government and Politics—P Sc 101, 111, 112, 113, 115, 161, 162, 177, 178, 190, 191, 192, 193, 194, 196; *Group D:* International Politics, Law, and Organization—P Sc 163, 171, 172, 181–82, 189, 197.

Political Science majors may apply for graduation with Special Honors. In order to be recommended by the Department for Special Honors, students must fulfill the general requirements (see page 50) and must complete with distinction a project of independent study, as demonstrated in a written paper, in addition to the normal credit requirements of particular courses. A committee of the Department will review the paper and make the recommendation for Special Honors.

Students who wish to undertake independent study for Special Honors should register with the secretary of the Department no later than the second week of each semester, and then consult with a member of the Department whose specialized interests lie in the area of the proposed research project. Students registered for P Sc 150 may qualify for graduation with Special Honors by completing with distinction the work connected with their internship.

Master of Arts in the field of Political Science.—Prerequisite: a Bachelor of Arts degree with a major in Political Science at this University (or an equivalent degree) with a *B* average (or better) in the major. Students are normally admitted in the fall semester.

Required: the requirements, pages 90–96, including a reading knowledge of a modern foreign language or a specified level of knowledge in statistics. The choice of the foreign language, or of statistics in lieu of a language, must be made with the approval of the Department. With the approval of the Department, students may elect one of the following programs: (1) 24 semester hours of graduate course work plus a thesis (equivalent to 6 semester hours) and the satisfactory completion of a Master's Comprehensive Examination in three fields of political science (selected from the areas of study listed below under the Ph.D. program); or (2) 36 semester hours of graduate course work, including two research seminars (equivalent to 6 semester hours) without a thesis and the satisfactory completion of a Master's Comprehensive Examination in four fields of political science (selected from the areas of study listed below under the Ph.D. program).

Doctor of Philosophy in the field of Political Science.—Admission preference is given to applicants who will be full-time students. Students are normally admitted in the fall semester.

Required: the general requirements, pages 90–94, 96–98, including (1) a reading knowledge of two modern foreign languages, or a reading, writing, and speaking proficiency in one modern foreign language, or a reading knowledge of one modern

foreign language and a specified level of knowledge in statistics, and (2) the satisfactory completion of a written General Examination in five coordinate areas of political science or four areas of political science and one cognate area (see list below).

Areas of study: American Political Process and Behavior, Comparative Government and Politics, Constitutional Law and Judicial Politics, International Law, International Politics, International Organization, Political Theory (Normative and Empirical), State and Urban Politics, The Presidency and the Administrative Establishment, U.S. Foreign Policy, and Politics of Latin America, Soviet Union, Eastern Europe, Western Europe, China, Far East, South and Southeast Asia, Africa (south of Sahara), Middle East.

Doctor of Philosophy fields of study in International Relations combine work in Economics, History, and Political Science.

Departmental prerequisite: P Sc 5–6 is prerequisite to all second-group courses in Political Science.

FIRST GROUP

5–6 Introduction to Political Science (3–3) Staff

P Sc 5: an introduction to the study of comparative political systems. Emphasis on contemporary concepts and techniques used to examine politics and government. P Sc 6: structure, powers, and processes of the American political system—Congress, the President, and the Supreme Court; elections, political parties, and pressure groups; state and local governments. (P Sc 5: fall—day; spring—evening. P Sc 6: fall—evening; spring—day.)

SECOND GROUP

101 Far East in the Modern World (3) Michael

General character of Far Eastern societies and their response to the impact of America, Europe, and Russia; American policy in the Far East and the influence of world communism. (Fall—day)

103–4 State and Local Governments (3–3) Burks

P Sc 103: state and local political systems, theory of sub-national governments, intergovernmental relations, metropolitan government and politics. P Sc 104: urban political systems, issues in urban politics, city and regional planning, and the political process. (Academic year—day)

105 Scope and Methods of Political Science (3) Wayne

Development of the discipline to its present state, nature of political inquiry, major approaches to the study of politics, empirical methods of political research. Prerequisite: Stat 51 or 53; or equivalent. (Fall and spring—day)

107 Problems in Modern Political Thought (3) Elliott, Krain

Development of democratic political institutions and analysis of main ideological changes during the 19th and 20th centuries; attention to the rise of socialism, communism, and fascism. (Fall—day)

108 Science, Technology, and Politics (3) Logsdon

Examination of the multiple impacts of scientific and technological developments on the social system. Evaluation of the response of the political system to these impacts. Discussion of policies for the support, use, and control of science and technology. (Spring—day)

111 **Comparative Government and Politics** (3) Kim, Elliott, Gyorgy

Introduction to the government and politics of the principal constitutional democracies of Western Europe: Great Britain, France, and the Federal Republic of Germany; secondary reference to other Western European systems and the communist government of East Germany. (Fall—day)

*112 **Comparative Government and Politics** (3) Elliott, Gyorgy

Introduction to the government and politics of the communist nations; emphasis on the Soviet Union and the countries of Eastern Europe. (Fall—day; spring—day and evening)

113 **Political Problems of the British Commonwealth** (3)

From Colonial Empire to modern Commonwealth: questions of equal partnership; governments and policies in principal Commonwealth states; problems of new states in Asia and Africa.

*115 **Government and Politics in Eastern Europe** (3) Gyorgy

Study of the contemporary social and ethnic structures, governmental systems, and international position of the Eastern European satellites. Emphasis on the post-World War II political evolution and present status of Soviet satellite nations.

117–18 **Political Theory: Nature and Growth of Western Political Thought** (3–3) Kraus, Linden

P Sc 117: foundations of Western political thought with emphasis on classical antiquity; Western political tradition. P Sc 118: the Renaissance and Reformation to recent times. Theoretical foundations of the modern state: morals and politics, sovereignty, absolutism, obedience, and resistance; liberalism, democracy, conservatism. (Academic year—day)

119–20 **American Political Thought** (3–3) Brewer, Morgan

Introduction to political thought in the United States from colonial times to the present. (Academic year—day)

121–22 **U.S. Constitutional Law and Politics** (3–3) Morgan

P Sc 121: separation of powers, federal-state relationships, economic regulation. P Sc 122: political and civil rights. Prerequisite: junior status. (P Sc 121: fall—evening. P Sc 122: spring—day.)

125 **The American Congress** (3) Robinson

Congress: the legislative process of the House of Representatives and Senate. The men, the committees, and the system. (Spring—evening)

126 **The American Presidency** (3) Wayne

Role of the Presidency in public policy formulation, development of the institution, the selection process, emphasis on legislative-executive relations. (Fall—day)

141 **Development of Legal Institutions** (3) Brewer

Introduction to historical jurisprudence: primary attention to the origins of Roman Law of Continental Europe and of Anglo-Saxon Common Law. (Spring—day)

* P Sc 112, 115, and 161 are related in their subject matter, and credit for only one of the three may be applied toward a degree.

145 **Political Parties and Politics** (3) LeBlanc, Robinson

Organization and operation of political parties in the United States: party system and structure, role of ideology, voting behavior, campaigns and elections, devices for organizing the government. (Fall—evening; spring—day)

146 **Political Pressures and Public Reactions** (3)

Public opinion, special interest lobbies, and pressure groups as they operate on government to influence public policy. (Spring—day)

150 **Internship in Politics** (3) Wayne, Robinson

Study of the political process in action by assignment to a congressional, state, or local government office to pursue a specific research project. Admission by selection of a departmental committee, with priority given to seniors majoring in Political Science. Papers judged meritorious qualify students for Special Honors in Political Science. (Fall and spring)

151 **Public Administration** (3)

Theory and practice of governmental administration, administrative systems in the public and private sectors, introduction to organization theory and behavior. (Fall—evening)

160 **Modern Communist Ideologies** (3) Elliott

Intensive study of 20th century communism; emphasis on its antecedents and possible evolution. Backgrounds, careers, and ideas of leading communist figures: Marx, Lenin, Stalin, Khrushchev, and Mao.

*161 **Soviet Government and Politics** (3) Linden

Analysis of influences in the formation of the Soviet system under Lenin, Stalin, and Khrushchev; the Soviet Communist Party; government and mass organizations; selected aspects of economic, cultural, social, and foreign policy.

162 **Government and Politics of China** (3) Staff

The Chinese Revolution: Chinese tradition, modern Chinese history, Marxism-Leninism and Soviet influence; the rise of the Communist Party of China. Principal power structures: party, bureaucracy, armed forces, police. Major domestic and foreign objectives and policies. Students who receive credit for P Sc 162 cannot receive credit for P Sc 194.

163 **Soviet Foreign Policy** (3) Elliott

Relations with United States, Third World, China; international communism; disarmament policy; instruments of foreign policy; interrelationships of domestic and foreign policies; ideology and foreign policy. (Fall—day)

167 **U.S. Foreign Policy** (3) Purcell

Constitutional and political factors that determine the formulation, execution, and substance of U.S. foreign policy. (Fall—day)

171 **International Politics** (3) Stempel, Murphy, Storrs

International actors, international and domestic environments of foreign policy, global and regional patterns, general characteristics of foreign policy. (Fall and spring—day)

* P Sc 112, 115, and 161 are related in their subject matter, and credit for only one of the three may be applied toward a degree.

172 **International Organizations** (3)

Development and operations of the United Nations, regional organizations, and functional international organizations. (Fall and spring—day)

177 **Governments and Politics in Latin America** (3) Storrs

Political processes and institutions in Latin America; emphasis on Argentina, Brazil, Chile, and Mexico. (Fall—day)

178 **Latin America: Political Patterns and International Relations** (3) Storrs

Patterns of political development, foreign policies of selected states, inter-American diplomacy and organization, United States-Latin American relations. (Spring—day)

181–82 **Public International Law and Organization** (3–3) Brewer, Hanessian

Survey of the public law of nations. P Sc 181: emphasis on the law of peace. P Sc 182: continuation of the law of peace; attention to neutrality and the so-called law of war. (Academic year—day)

189 **African International Politics** (3) Nimer

Analysis of interstate relations in Africa and of selected aspects of African relations with the outside world. Recommended but not required: P Sc 190 or equivalent. (Spring—day)

190 **Politics of Middle and Southern Africa** (3) Nimer

Comparative analysis of the political systems of selected countries of non-Mediterranean Africa. (Fall—day)

191 **Governments and Politics of the Middle East** (3) Reich

Domestic and international politics of the eastern Arab states, Turkey, Iran, Israel. (Fall—day)

192 **Governments and Politics of North Africa** (3) Reich

Domestic and international politics of Algeria, Tunisia, Morocco, Libya, Egypt, Sudan; their relations with states of the Middle East. (Spring—evening)

193 **Governments and Politics of South and Southeast Asia** (3) Hinton

Domestic and international politics of the major states in the area, particular reference to India. (Fall—evening)

194 **Governments of China and Japan** (3) Michael

Institutions and processes of government in contemporary China and Japan, with some historical background. Attention to ideological forces. Students who receive credit for P Sc 194 cannot receive credit for P Sc 162. (Spring—evening)

196 **Problems of Modern Political Leadership** (3) Kraus

Lectures and discussions on problems of political leadership in developing states.

197 **Proseminar: International Affairs** (3) Purcell, Reich, Storrs

Diplomatic, economic, psychological, military problems of U.S. foreign policy. Readings, term papers, discussion. Primarily for seniors in the International Affairs curriculum; open to a limited number of other qualified students. (Fall and spring—day)

199 **American Government and Politics** (3) LeBlanc

Proseminar: reading and research as a basis for analyzing significant problems. Open to seniors in Public Affairs and Political Science curricula. (Spring—day)

THIRD GROUP

Graduate reading courses and seminars may vary in theme from year to year and may be repeated for credit with the approval of the student's adviser and the consent of the instructor.

201 **Seminar: Scope and Methods of Political Science** (3) Wayne

Reading and research. (Fall—evening)

203–4 **State and Local Governments** (3–3) Burks

P Sc 203: readings and group discussions on the process of politics at state and local levels. P Sc 204: readings and advanced research in selected topics of state and local politics. (Academic year—evening)

205 **Government, Science, and Technology** (3) Logsdon

The impact of scientific and technological developments on national and international political systems; demands on the political system resulting from these impacts; responses of the institutions and processes of government to these demands. (Fall—evening)

206 **Seminar: Science, Technology, and Public Affairs** (3) Logsdon

Research seminar in selected domestic policy issues. Emerging concepts and techniques of technology assessment. Teams of students will prepare pilot assessments. (Spring—evening)

208 **Seminar: Science, Technology, and World Order** (3) Hanessian

Research seminar in selected international policy issues of scientific or technological importance. Directed reading and research on global issues and current international and multinational activity and techniques for their assessment and resolution. (Spring—evening)

209 **Seminar: the American Presidency** (3) Wayne

Reading and research on the institutionalized features of the American Presidency; emphasis on the politics of the executive branch. (Spring—evening)

210 **Seminar: the American Congress** (3) Robinson

Reading and research on the Congress of the United States. (Fall—evening)

211 **Readings in Comparative Government and Politics** (3) Kim

Methodological questions; comparative political processes and systems; some attention to legislatures, executives, parties, public services, the role of the military. (Fall—day and evening)

212 **Seminar: Comparative Government and Politics** (3) Kim

Selected topics in comparative political institutions and politics. Each semester is devoted to a selected country or significant institutional or policy problem. Attention is directed to questions of method. (Spring—day)

213–14 **Comparative Communist Systems** (3–3) Linden

(Replaces former P Sc 230 Seminar: International Communism, and P Sc 284 Seminar: Comparative Communist Systems)

Comparative study of the communist world; examination of sources of both the unity and diversity of modern communism. Attention is given to the broad doctrinal-ideological and political aspects of communist systems, the patterns of politics within and among communist leaderships, and the critical relationship between communism and nationalism. A sequence of general topics and case studies in the second half of the course serves as a basis for examining changing trends and developments in the communist states and parties. (Academic year—day)

215–16 **Seminar: the Communist Camp in World Politics I-II** (3–3)

P Sc 215: significant issues of communism, particularly in the Soviet Union and Red China; concept and structure of "world socialist system"; intra-Bloc relations with emphasis on the Sino-Soviet dispute. Prerequisite: 3 semester hours in modern political theory. P Sc 216: political ramifications of the communist movement and its relations with the non-communist world. Prerequisite: 3 semester hours in international relations or comparative government.

217 **Readings in Political Theory** (3) Kraus

Readings and discussions, principally on modern political and constitutional theory since the 17th and 18th centuries; emphasis on basic themes and schools of thought. (Fall—evening)

218 **Seminar: Topics in Political Theory** (3) Kraus

Research and discussion on problems of modern political and constitutional theory; theoretical aspects of representative government, democracy, socialism, totalitarianism. (Spring—evening)

221–22 **The United States Constitution and the Judicial Function** (3–3) Morgan

P Sc 221: readings and group discussions on constitutional law and politics. P Sc 222: seminar on selected topics of constitutional law and judicial behavior.

224 **Readings in Socialism and Communism** (3) Kraus

Readings and discussions of primary and secondary works to explore genesis and transformations of a strand of political speculation—from pre-Marxian and Marxian socialism to contemporary Marxism-Leninism. Prerequisite: 3 semester hours in modern political theory. (Fall—evening)

225 **Seminar: Marxism-Leninism** (3) Kraus

Crucial theoretical problems, such as the nature of revolution, dictatorship of the proletariat, transition to communism, imperialism, and national liberation in Marxian and contemporary communist doctrine. Prerequisite: P Sc 224 or permission of instructor. (Spring—evening)

227 **Seminar: Governments and Politics of Eastern Europe** (3) Gyorgy

Comparative study of principal political, social, economic institutions; Soviet stake; patterns of Soviet domination; efforts toward economic and political integration; impact of the Sino-Soviet dispute; U.S. policy toward satellite nations. (Spring—day)

229 **Readings in Soviet Government and Politics** (3) Elliott

Readings in contemporary Soviet domestic government and politics. Prerequisite: 3 semester hours selected from Hist 146, P Sc 112, or equivalent. (Fall—evening)

*231 **Seminar: Sino-Soviet Relations** (3) Michael

Background, development, and status of conflict within the communist movement; emphasis on the role of Chinese communists. Prerequisite: 3 semester hours selected from Hist 187; P Sc 101, 194; or equivalent. (Spring—day)

232 **Seminar: International Communications** (3) Dasbach

East-West perspectives. Theory and history of national patterns of international communications focusing on basic political and psychological aspects of communication between major communist and noncommunist powers. (Spring—day)

233 **Seminar: Soviet Government and Politics** (3) Elliott

Research seminar in selected problems of Soviet domestic government and politics. Emphasis: since Stalin. Prerequisite: P Sc 229 or permission of instructor. (Spring—evening)

234 **The Soviet Political Process** (3) Staff

Influence of revolutionary ideas, traditions, and accidental events on Soviet organization, and on administration of Soviet social, economic, national, and military policies; application of these policies by leaders to maintain power. (Fall—day)

235–36 **City and Regional Planning Processes** (3–3) Staff

Examination of city and regional planning and land use processes. Role, significance, and nature of responsibilities of comprehensive and functional area planning agencies and organizations at the local, sub-regional, and metropolitan levels. Strategies of administrators and other participants in decision-making of metropolitan planning. Economic, social, political, and administrative influences on land use and planning in the metropolitan area. P Sc 235: readings and group discussion. P Sc 236: readings and advanced research. (P Sc 236: spring—evening)

†237 **Chinese Law** (3) Hsia

Emphasis on the legal system of Communist China; analysis of the constitutional law of the People's Republic of China, including general principles, state structure, and rights and duties of citizens; a brief survey of the administration of justice—courts, procuratorates, and lawyers; marriage law; land law; counterrevolutionary act and other criminal statutes; principles of civil law; communist Chinese concept of international law. (Spring—evening)

‡238 **Soviet Law** (3) Ramundo

Concept of "socialist legality"; legal relationship of individual to state and other participants in Soviet society; role of Party in Soviet legal system; Soviet philosophy of law; state (constitutional) law: Soviet federalism, governmental apparatus, rights and obligations of citizenship; criminal

* An interdepartmental course offered by the departments of Political Science and History.
† Same as Law 547 (2). Graduate students registering for P Sc 237 make special arrangements with the instructor for supplementary assignments equivalent to one additional semester hour.
‡ Same as Law 546 (2). Graduate students registering for P Sc 238 make special arrangements with the instructor for supplementary assignments equivalent to one additional semester hour.

law; property law; labor law; selected topics in civil law and procedure; international law. (Fall—evening)

245–46 **The American Political Process** (3–3) LeBlanc

P Sc 245: readings and group discussions on the nature and functions of political parties and the role and techniques of political interest groups. P Sc 246: seminar on selected topics of American politics. (Academic year—evening)

253 **Seminar: Chinese Government and Politics** (3) Michael

Political institutions and concepts in late imperial times, during the revolution, under national government, and under communism. Emphasis on the communist period. Prerequisite: 3 semester hours selected from Hist 187; P Sc 101, 194; or equivalent. (Fall—day)

254 **Colloquium: Modern China** (3) Michael

Interuniversity research colloquium of faculty members of the Institute for Sino-Soviet Studies and other area universities from different disciplines concerned with the study of modern China. Critical discussions of research plans and studies in progress in weekly sessions. Advanced graduate students admitted with permission of faculty group. (Fall and spring—day)

255 **Colloquium: Russia and Eastern Europe** (3) Gyorgy

Interuniversity research colloquium of faculty members of the Institute for Sino-Soviet Studies and other area universities from different disciplines concerned with the study of Russia and Eastern Europe. Critical discussions of research plans and studies in progress in weekly sessions. Advanced graduate students admitted with permission of faculty group. (Fall and spring—day)

257 **Seminar: Communism in Developing Countries** (3)

Examination of international communist policy for, and communist parties in, developing countries. Case studies of Asia, Africa, and Latin America. Basic communist concepts of imperialism and nationalism; development and current application of Soviet and Chinese variants of strategy and tactics for "national liberation."

258 **Seminar: Communist Parties in the Noncommunist World** (3)

Movements and ideological variations of communist parties of France, Italy, the Scandinavian countries, and other Central and West European nations. Case studies on communist problems of Middle East and North African nations.

265–66 **Chinese Communist Policy Processes** (3–3) Hinton

Determinants of policy, view of the world, instrumentalities and locus of power, interrelationship between domestic and foreign policy, formulation and implementation of policy. Prerequisite to P Sc 265: 3 semester hours selected from P Sc 101, 194, or equivalent. Prerequisite to P Sc 266: P Sc 265 or equivalent. P Sc 265: readings. P Sc 266: research seminar. (Academic year—evening)

267 **Seminar: U.S. Foreign Policy** (3) Purcell

Research and selected reading as the basis for an analysis of the foreign policy of the United States, with particular reference to the decision-making process and the execution of policy. (Fall—evening)

268 **Seminar: Comparative Foreign Policies** (3)

Research and selected reading as the basis for an analysis of the foreign policies of major powers, with particular reference to the decision-making process and the execution of policy. (Spring—evening)

269 **Seminar: Soviet Foreign Policy** (3) Elliott

External policies and relations of the USSR: world objectives of Soviet leaders; relations with other communist states, Western powers, and other countries; international propaganda, disarmament policy, foreign economic relations. Prerequisite: 3 semester hours selected from Hist 137, 145–46, or equivalent. (Spring—evening)

270 **Political and Social Institutions of Eastern Europe** (3) Gyorgy

Major political and social factors which have shaped the inter-war, World War II, and post-war evolution of Eastern Europe. Emphasis on sociological and anthropological forces which have contributed to "Balkanization" of this area in the last fifty years. Each time the course is offered the concentration will be on one or two selected countries. (Fall—day)

271–72 **Problems in International Organizations** (3–3)

P Sc 271: analysis of the political dimension of international organizations; special reference to the United Nations. P Sc 272: examination of the operational and administrative aspects of international organizations: special reference to regional and functional bodies. (Academic year—evening)

273 **Public Opinion and Foreign Policy** (3)

Development, organization, and operation of international information programs by major world powers. U.S. public opinion influencing foreign policy formation and conduct. (Spring—day and evening)

274 **Principles and Problems of International Political Communication** (3) Dasbach

Reading and discussion of public opinion/foreign policy relationships and operation of international political communication programs by major world powers as a tool of foreign policy. (Fall—evening)

275–76 **International Politics** (3–3) Nimer

P Sc 275: reading and discussion of recent and older works of theoretical significance, both empirical and normative. P Sc 276: individual research on and class discussion of selected international political topics. (Academic year—day and evening)

277–78 **Seminar: Latin American Politics** (3–3) Storrs

P Sc 277: readings and discussions on Latin American political processes and institutions. P Sc 278: individual research and class discussion on selected topics of Latin American politics. (Academic year—evening)

*280 **Vietnam: Causes and Prospects** (3) White, Gordon

An interdisciplinary, area-centered approach, with primary stress on the causes of the war, but with attention also to the future of Southeast Asia as a whole. (Spring—day)

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* An interdepartmental course offered by the departments of Political Science and Psychology.

281–82 **Seminar: Public International Law** (3–3) Brewer

Research in the public law of nations, with special attention to problems of pacific settlement, sanctions, war, neutrality, and state jurisdiction, and to their political implications. (Academic year—day)

*283 **Topics in International Law** (3)

*285 **Diplomacy since World War II** (3)

287 **Seminar: Problems in Latin American Civilization** (3) Rodríguez

Interdisciplinary seminar, guided by a specialist in the methodology of his chosen discipline; each student writes a report on some aspect of a key theme (i.e., Nationalism) in Latin America's experience. Admission by permission of instructor. (Spring—day)

288 **Seminar: Soviet Military Policy and Strategy** (3) Staff

Soviet developments in military policy and strategy with attention to intra-Bloc military cooperation, political context of Soviet military policy, significant changes in recent Soviet military thought. (Fall or spring)

290 **Topics in African Politics** (3) Nimer

Reading, research, and discussion of selected aspects of African domestic and international politics. (Spring—evening)

291 **Governments and Politics of the Middle East** (3) Reich

Reading and research in selected problems in the governments and politics and international relations of the Middle East. (Fall—evening)

292 **Governments and Politics of North Africa** (3) Reich

Reading and research in selected problems in the governments and politics and international relations of North Africa. (Spring—evening)

293 **Seminar: Governments and Politics of South and Southeast Asia** (3) Purcell

Research and selected reading as basis for analysis of structure, problems, and policies of the governments of selected countries in the area, with particular reference to India. (Spring—evening)

294 **Seminar: Governments and Politics of Japan and Korea** (3)

Readings, research, and discussion on the contemporary political problems and relevant historical background of Japan, North and South Korea. (Fall or spring)

295 **Seminar: Chinese Communist Foreign Policy** (3) Hinton

Objectives; formulation and implementation of foreign policy; Communist China as Asian state, revolutionary influence, would-be power. Prerequisite: 3 semester hours selected from P Sc 101, 194, or equivalent.

296 **Seminar: the Communist Role in Far Eastern International Politics** (3) Hinton

Evolution of communist strategy for Asia, armed struggle in South and Southeast Asia, wooing of national bourgeoisie, development of Asian communist states, local communist parties since World War II, Sino-Soviet rivlary. (Fall—evening)

297 **Independent Studies** (arr.) Staff

Limited to Master's candidates. Permission of instructor, in writing, required. (Fall and spring)

* Offered in War College programs only.

298 **Southeast Asia in World Politics** (3) Gordon

Southeast Asia in great-power perspective. Overlapping and conflicting interests, foreign policies, and military requirements of the United States, Japan, China, and the USSR. Balance-of-power concept and development of Asian subsystem. (Spring—evening)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Psychology

Professors Thelma Hunt *(Emeritus)*, E.L. Phillips, J.N. Mosél *(Chairman)*, B.I. Levy, W.E. Caldwell, R.D. Walk, R.K. White, Gardner Murphy *(Visiting)*, Jacqueline Goodnow, M.L. Meltzer

Adjunct Professors Yvonne Brackbill, A.J. Caron, Rose Caron

Professorial Lecturers W.A. McClelland, J.E. Uhlaner, B.M. MacLennan, R.K. Kahn

Associate Professors C.E. Tuthill, Eva Johnson, Virginia Kirkbride, R.H. Tanck *(Research)*, D.E. Silber, Charles Rice, Eugene Abravanel, S.A. Karp, Dorothy Huntington *(Research)*•

Adjunct Associate Professor C.J. Lange

Associate Professorial Lecturer J.B. Margolin

Assistant Professors R.W. Holmstrom, J.A. Bull III, Sally Sibley *(Research)*, L.A. Rothblat

Assistant Professorial Lecturer S.L. Cohen

CLINICAL TRAINING STAFF

Associate Clinical Professors A.M. Rochlin, Donald Jewell, I.M. Zimmerman, Bruce Becker, J.W. Cummings, Mimi Spielberg, Barbara Hammer, Meira Zedek

Assistant Clinical Professors Alice Adams, Andrea Doman, J.M. Smothers

Bachelor of Arts with a major in Psychology (Departmental).—Prerequisite: the Arts and Letters curriculum, page 76, and Psyc 1 and 5, or 1 and 6, or 5–6.

• Dr. Huntington is Associate Research Professor in Pediatrics (Child Development) in the School of Medicine.

The general requirements for the degree are stated on pages 81–85. The 60 required semester hours, in addition to those taken as prerequisites, must include 24 hours in second-group Psychology courses, including Psyc 196 and one course from each of the following groups—Group A: Psyc 118, 121, 161; Group B: Psyc 115, 151, 156; Group C: Psyc 112, 129, 131, 144. Stat 53 or 104, or an appropriate course in mathematics, is required.

Master of Arts in the field of Psychology.—Prerequisite: the degree of Bachelor of Arts with a major in Psychology at this University, or an equivalent degree. Admission to the program is limited; preference will be given those who plan to continue toward a Doctor of Philosophy degree.

Required: the general requirements, pages 90–96. Of the 24 required semester hours (exclusive of the thesis), a minimum of 18 must be in third-group Psychology courses including Psyc 202 and either 203 or 204; 6 may be in related fields approved by the Department. For detailed requirements consult the Chairman of the Department.

Doctor of Philosophy in the field of Psychology.—Prerequisite: the degree of Bachelor of Arts with a major in Psychology. Students admitted from other disciplines will be expected to complete prerequisite undergraduate courses to prepare for graduate study in Psychology. Qualifying scores on the Miller Analogies Test and the Aptitude Test of the Graduate Record Examination are required for admission.

Required: the general requirements, pages 90–94, 96–98, including (1) with the exception of Epid 230, the satisfactory completion of the tool requirement (see page 97); (2) Psyc 202, 203–4, Stat 105; and (3) the satisfactory completion of the General Examination in five fields (one in general psychology, one in an area of specialization, and three elected).

Areas of study: Psychology (Clinical, Developmental, Experimental, Industrial and Organizational, Social), Personality and Experimental Psychopathology.

Students electing Psychology courses in the freshman year should begin with Psyc 1; with permission of instructor students may elect Psyc 5–6 in the freshman year.

Departmental prerequisite: Psyc 1 or 5 or 6 is prerequisite to all other courses in Psychology. Six semester hours in Psychology courses are prerequisite to all second-group courses in Psychology.

FIRST GROUP

1 **General Psychology (3)** Staff

Fundamental principles underlying human behavior. (Fall and spring—day and evening)

5–6 **Principles and Methods of Psychology** (3–3) Walk, Abravanel

Lecture (2 hours), laboratory (2 hours). An experimental approach to understanding behavior; individual and class experiments performed. Psyc 5: awareness, discrimination, sensation, perception, and emotions and their relation to adaptive behavior. Psyc 6: topics of motivation, learning, memory, and problem-solving. Laboratory fee, $6 a semester. (Psyc 5: fall—day and evening. Psyc 6: spring—day)

8 **Psychology of Motivation and Personality (3)** Tuthill, Silber, Rice, Holmstrom

Introduction to the psychology of personality. Principles of motivation, personality development, social and cultural factors, and assessment and description of personality emphasized. (Fall and spring—day and evening)

22 **Introduction to Educational Psychology** (3) Kirkbride, Tanck
Consideration of individual and group differences, adjustments, and the psychology of learning in relation to education and training. (Fall and spring—day and evening)

29 **Psychology of Childhood** (3) Johnson
Developmental approach to study of the child. Emphasis on the socialization process, learning, and the child's view of the world. (Fall—day; spring—evening)

SECOND GROUP

101 **Abnormal Psychology** (3) Meltzer, Silber, Holmstrom
Causes, diagnosis, treatment, and prevention of various types of maladjustments and mental disorders. Prerequisite: 6 semester hours in psychology, or 3 in psychology and 6 in a biological science. (Fall and spring—day and evening)

110 **Cognitive and Perceptual Development** (3) Abravanel
Concepts and research in the area of developmental psychology; emphasis on the growth and development of perception, cognition, and language. (Spring—day)

112 **Psychology of Adolescence** (3) Johnson
Psychological characteristics and problems peculiar to adolescence, with emphasis on applications of psychology to solution of such problems. (Fall—day)

115 **Psychology of Language and Communication** (3) Mosél
Introduction to psycholinguistics and verbal behavior. Information theory, generative grammar theory, cultural and linguistic structures in the perception and learning of language. (Fall—day)

118 **Physiological Psychology** (3) Rothblat
Basic structure and functions of sensory systems, motor systems, central nervous system, autonomic nervous system, and endocrine system, with emphasis on the relations between physiological functioning and behavior. (Fall and spring—day)

121 **Psychology of Learning** (3) Bull
Current learning theories and issues. (Fall—day)

129 **Theories of Personality** (3) Kirkbride, Karp
Survey of personality theories; emphasis on their application to problems of individuals. (Fall—day)

131 **Psychological Tests** (3) Hunt, Karp
Survey of psychological tests and their more common uses in business, industry, government, law, medicine, and education. Material fee, $7. (Fall—day; spring—evening)

144 **Personnel and Industrial Psychology** (3) Mosél
Psychological concepts and methods applied to problems of personnel management, human engineering, employee motivation, and productivity. (Spring—evening)

145 **Psychology of Management** (3) — Cohen

Primarily for students in the schools of Engineering and Applied Science and Government and Business Administration. Introduction to principles of industrial organizations and personnel selection. (Fall and spring—evening)

151 **Social Psychology** (3) — Tuthill, White

Social foundations of attitudes and behavior: cognition, motivation, role-behavior, communication, small-group processes, racial attitudes, nationalism, and war. (Fall—evening; spring—day)

156 **Psychology of Attitudes and Public Opinion** (3) — Tuthill

Psychology of opinion formation, measurement of opinion, social determinants of attitudes, psychological processes in propaganda, bases of receptivity to propaganda, psychological warfare. (Spring—evening)

161 **Comparative Psychology** (3) — Caldwell

Lectures and demonstrations on animal psychology. Psychological processes in infrahuman organisms, evolution of behavior, the place of animal experimentation and research in psychology. (Spring—day)

191 **Independent Research in Psychology** (3) — Staff

Opportunity for work on individual library or experimental projects. Open to qualified students by permission; arrangements must be made with the sponsoring faculty member prior to registration. May be repeated once for credit. (Fall and spring)

192 **Field Experience in Psychology** (3) — Abravanel

Selected senior psychology majors will spend a minimum of 6 hours a week in a local hospital, school, or community setting. Students registering for this course must have the approval of the Chairman of the Department by May 1 for the fall semester and by December 15 for the spring semester. (Fall and spring)

196 **History and Systems of Psychology** (3) — Caldwell and Staff

Senior capstone course which includes a survey and integration of the major viewpoints and concepts of psychology. Required of Psychology majors. (Fall—day; spring—evening)

198 **Current Research Issues in Psychology** (3) — Staff

Conducted as a seminar. Recent experiments in psychology, including those performed by members of the class; emphasis on student participation. Limited to senior Psychology majors. May be repeated for credit. (Spring—day)

THIRD GROUP

Third-group courses are limited to graduate students in Psychology, except by special permission of instructor and Chairman of the Department.

202 **Psychological Research Methods and Procedures** (3) — Walk, Abravanel

Required in all graduate Psychology programs. Prerequisite: a laboratory course in experimental psychology and an elementary course in statistics. (Spring—day)

203–4 **Experimental Foundations of Psychology** (3–3) Bull

Required of doctoral students in Psychology during first year of study. Psyc 203: problems in physiologic processes, psychophysics, sensation, and perception. Psyc 204: motivation, learning, cognitive processes. (Academic year—day)

205 **Research Methods in Intervention Programs** (3) Karp

Consideration of the special problems of conducting research in a clinical setting; emphasis on issues of content and method of studies designed to assess effects of therapeutic intervention. Prerequisite: Psyc 202. (Fall—day)

206 **Methods of Clinical and Personality Research** (3) Rice

Review of techniques especially relevant to research in clinical, personality, and social psychology. Scaling methods, multivariate techniques, and an introduction to the use of computers in data analysis. Prerequisite: Psyc 202; Stat 105 or equivalent. (Spring—day)

207–8 **Psychological Assessment** (3–3) Holmstrom, Levy, Meltzer, Silber

Open only to graduate students in the Department of Psychology. Theoretical and clinical aspects of assessment; includes interviewing, psychometric tests, and projective techniques. Two-hour laboratory—diagnostic work at clinical facilities. Material fee, $7 a semester. (Academic year—day)

209 **Seminar: Psychology of Motivation** (3) Caldwell

Various theoretical approaches to the psychology of motivation; systematic concepts and experimental findings deriving from each approach. (Spring—day)

211 **Assessment of Cognitive Functioning** (3) Karp

Concepts of intelligence and achievement and their assessment through a variety of group and individual procedures. Emphasis on evaluation of children. Material fee, $7. Admission by permission of instructor. (Fall—day)

212 **Personality Assessment by Projective Techniques** (3) Levy

Methods of personality assessment, including psychometric and projective tests. Material fee, $7. Admission by permission of instructor. (Spring—evening)

213–14 **Seminar: Developmental Psychology** (3–3) Abravanel, Goodnow, Walk

Psyc 213: research and theory in developmental psychology, emphasis on perceptual and cognitive development; consideration of the development of social awareness and of genetic-biological growth processes. Psyc 214: emphasis on current research and theory in perceptual and cognitive development, intensive study of selected research problems. (Academic year—day)

215 **Personality Assessment by Multiple Procedures** (3) Meltzer

Consideration and use of a wide range of procedures in assessment of personality and psychopathology of children. Prerequisite: Psyc 207–8 or 211 and 212. Graduate students in fields other than Psychology admitted by permission of instructor. Material fee, $7. (Fall—day)

218 **Seminar: Systems of Psychotherapy** (3) Silber

Introduction to theory and technique of psychotherapeutic approaches: psychoanalytic, ego-centered, nondirective, transactional, and others. Original sources surveyed. (Spring—evening)

220 **Seminar: Abnormal Psychology** (3) Meltzer

Study of selected problems. (Fall—day)

221–22 **Seminar: Group Psychotherapy** (3–3) MacLennan

Psyc 221: didactic material and laboratory experience with emphasis on group dynamics and processes; survey of group therapy approaches. Psyc 222: supervised experience with therapeutic groups. Prerequisite to Psyc 222: Psyc 221 and permission of instructor. (Academic year—evening)

223 **Seminar: Learning** (3) Staff

Selected topics in the psychology of learning. (Spring—day)

226 **Seminar: Clinical Psychology of Childhood and Adolescence** (3) Johnson

Survey of behavior and personality disorders. (Spring—evening)

227–28 **Seminar: Principles of Psychotherapy** (3–3) Kahn

Patient's needs and demands on the therapist. Case participation heavily relied upon. Open to qualified students in Psychology and related fields, with permission of instructor. Prerequisite: Psyc 218. May be repeated once for credit. (Academic year—day)

229 **Seminar: Principles of Behavior Change** (3) Phillips

Stimulus-organism-response variables and their interactions, with emphasis on learning theory as applied to clinical problems. (Fall—day)

230 **Seminar: Operant Applications to Clinical Problems** (3) Sibley

Examination of the broad role of reinforcement contingencies, behavior shaping, and other experimentally derived concepts as they apply to the management and control of a wide variety of human clinical problems. Prerequisite: Psyc 229. (Spring—day)

231 **Development of Psychometric Instruments** (3) Mosél

Quantitative techniques and principles used in construction, standardization, and evaluation of personality and ability measures for research and practice; quantification of human judgment for measurement purposes. Prerequisite: course in tests and measurements and an elementary course in statistics.

234 **Seminar: Theory of Psychological Measurement** (3) Mosél

Development of classical axiomatic-deductive theory underlying major notions in the construction and evaluation of psychological tests.

235–36 **Seminar: Community Mental Health** (3–3)

(Replaces former Psyc 219 Seminar: Topics in Advanced Clinical Psychology (3))

Psyc 235: survey of issues and techniques in community mental health, including effect of social systems on mental health, preventive practices, epidemiology, and community intervention approaches. Psyc 236: supervised work in a community mental health project. Prerequisite to Psyc

236: Psyc 235 and permission of instructor. (Academic year—evening)

245 **Seminar: Organizational Behavior** (3) Mosél

Analysis of organizational behavior; emphasis on motivation and productivity. Recent research on employee attitudes, primary group, effects of various patterns of supervisory leadership, role of formal and informal organization, job design. (Spring—evening)

246 **Seminar: Personnel Measurement Techniques** (3) Mosél

Detailed consideration of techniques of personnel selection and performance evaluation. Employment tests, personal data, assessment interviews, and performance ratings.

251 **Seminar: Advanced Social Psychology** (3) Tuthill, White

Current research and theory: motivation and cognition, dissonance, social interaction theory, authoritarianism, class differences, group dynamics, group conflict. (Fall—day)

252 **Research Methods in Social Psychology** (3) Tuthill

Opinion and attitude survey techniques: interviewing, content analysis, report-writing, etc. (Spring—evening)

254 **Seminar: Experimental Social Psychology** (3) Tuthill

Experimental study of small groups, autocratic and democratic group climates, interaction process analysis. Lewin's field-theoretical approach to individual and group processes. (1971–72 and alternate years: spring—evening)

256 **Seminar: Psychological Causes of War** (3) White

An attempt to integrate evidence from animal behavior, child behavior, anthropology, psychiatry, and recent history, including World Wars I and II and the present East-West conflict. (Spring—day)

259 **Seminar: Social Psychology of Communism** (3) White

Public and governmental opinion in communist countries, authoritarian thinking, communist propaganda, problems of Western communication with communist countries. (Fall—evening)

261 **Seminar: International Communication** (3) Mosél

Primarily for students in the schools of Government and Business Administration and Public and International Affairs. Communicating information and effecting attitude change across cultures by mass media. Emphasis on psychocultural factors and the functions of mass communication in the development of transitional societies. (1971–72 and alternate years: spring—evening)

272 **Seminar: Theories of Personality** (3) Caldwell

Emphasis on theoretical problems and methodology in the field of personality study. (Fall—evening)

*280 **Vietnam: Causes and Prospects** (3) White, Gordon

An interdisciplinary area-centered approach, with primary stress on the causes of the war, but with attention also to the future of Southeast Asia as a whole. (Spring—day)

* An interdepartmental course offered by the departments of Psychology and Political Science.

283–84 **Practicum in Clinical Psychology** (3–3) Silber

Supervised practical instruction in agencies doing clinical psychological work. Prerequisite: Psyc 212. Admission by permission of instructor. (Academic year)

289 **Seminar: Current Topics in Experimental Psychology** (3) Staff

Review and discussion of contemporary research and theory in a specialized field of psychological study, by leaders in the field. Independent topics each semester; may be repeated for credit. (Fall—day; spring—evening)

290 **Seminar: Special Problems in Personality Research** (3) Murphy

Selected theoretically important and challenging contemporary research problems. May be repeated once for credit. (Fall and spring—day)

292 **Seminar: Perception** (3) Walk

Study of current research and theory in the experimental psychology of perception. (1972–73 and alternate years: fall—day)

293 **Seminar: Psychology of Thinking** (3) Rice

Thinking and problem solving. Specific topics include concept formation, nature of insight, and other cognitive processes. (1971–72 and alternate years: spring—day)

295 **Independent Research in Psychology** (arr.) Staff

Individual library or experimental research under supervision of staff member. Arrangements must be made with sponsoring faculty member prior to registration. May be repeated once for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Public Administration

Professors D.S. Brown, Waldo Sommers, K.E. Stromsem, S.M. Rosen *(Visiting)*, D.R. Cloutier *(Chairman)*

Professorial Lecturers W.G. Torpey, C.E. Goode, Ben Posner, C.L. Berg, R.R. Temple

Associate Professorial Lecturers Ross Pollock, L.B. Pouliot, W.E. McConville, M.R. Burt

Assistant Professors S.R. Chitwood, M.M. Harmon

Programs of study in Public Administration leading to the degrees of *Master of Public Administration*, *Master of Arts in Government*, and *Doctor of Public Ad-*

ministration are offered by the School of Government and Business Administrtation (see pages 127–54).

THIRD GROUP

213 **Administration in Government** (3) Cloutier

Critical analysis of federal administrative organizations as an integral part of the political system. Roles of Congress, the President, the courts, interest groups, political parties, and the public in the administrative process; special attention to centripetal and centrifugal forces. (Fall—day and evening; spring—evening)

214 **Policy Analysis in Public Administration** (3) Chitwood

Introduction to systematic analysis of public policy alternatives. Development of a conceptual framework for differentiating types of public policies, e.g., distributive, regulatory, redistributive; examination of the contribution of economic, quantitative, and research techniques to the development, administration, and evaluation of these policies. (Fall—evening)

215 **Comparative Administrative Systems** (3) Staff

Examination and analysis of the administrative systems of selected foreign governments; attention to practices applicable to administration in the United States.

216 **Administration of International and Supranational Activities** (3) Staff

Analysis of the evolution and application of the administrative process in selected international and supranational activities. Problems of organization and management in multi-national supported and staffed activities.

217 **Seminar: Developmental Administration I** (3) Brown

National cultures and their relationships to administrative systems. Colonialism and its vestiges. The problems and deficiencies of administration in underdeveloped countries. (Fall—evening)

218 **Seminar: Developmental Administration II** (3) Brown

Problem of the transfer of administrative capability from one country to another. Political and administrative development. Unilateral and multilateral approaches. The role of the innovator. Strategies of administrative development. (Spring—evening)

221 **Management in the Executive Branch** (3) Rosen

Analysis of application of management theory and practice in the executive branch of the federal government: emphasis on staff responsibilities and relationships and internal organization and control. (Fall and spring—evening)

223 **Behavioral Factors in Large Organizations** (3) Brown

Analysis of the nature and characteristics of bureaucracy; dysfunctionalism; approaches to policy guidance and leadership, particularly in large public organizations; influence and control systems. (Fall and spring—evening)

231 **Public Personnel Administration** (3) Sommers

Survey of basic principles and functions of personnel administration in the public service. Roles of personnel management, recruitment, place-

ment, wage and salary administration, training, retirement, and other personnel functions. (Fall—evening)

232 **Problems in Public Personnel Management** (3) Sommers

Analysis and evaluation of major personnel management problems in government; employee-management relations; interagency and intergovernmental relationships. Impact of automation. Evaluation of personnel systems. (Spring—evening)

233 **Seminar: Manpower Development and Utilization** (3) Harmon

Analysis of manpower resources. Research projects and case studies in ways and means of increasing employee potential; use of training programs, executive development, incentive systems. (Fall—evening)

235 **Technological Change and Manpower** (3) Staff

Research, discussion, and readings dealing with manpower problems arising from automation and other technological changes. Evaluation of these developments in government and business; their implications for productivity, employment, training and education, and personnel and industrial relations. Analysis of economic, political, and social factors influencing public and private industry manpower policies. (Spring—evening)

*243 **Local Government Law** (3) Nutting, Pock

Decision-making processes in metropolitan and local communities; types and objectives of city, county, and special-function local government units; intergovernmental relations; original organization and changes; personnel; local lawmaking; responsibility in tort; introduction to community planning. (Fall or spring)

246 **Urban Dynamics and Citizen Participation in Administration** (3)
(Formerly Urban Dynamics)

Exploration of the nature, costs, and benefits of citizen participation in administration of metropolitan area programs. Focus on tools of citizen participation, their impact on federal policy and reorganization of urban government, and the effect of decentralization on citizen participation. (Fall—evening)

248 **Financing Metropolitan Services** (3) Cloutier

Analysis of the structure and administration of public finance of local governments. (Spring—evening)

249 **Administration in Metropolitan Area Governments I** (3) Cloutier, Harmon

Public administration in metropolitan areas. An ecological approach to understanding the interrelationship between the management of urban programs and economic, social, and political factors that affect the urban environment. (Fall—day and evening)

250 **Administration in Metropolitan Area Governments II** (3) Burt, Harmon

Application of policy analysis in metropolitan administration, including the consideration of specific federal, state, and local programs in metropolitan areas. (Spring—day and evening)

* Same as Law 349 (2). Students electing P Ad 243 make special arrangements with instructor for supplementary assignments equivalent to one additional semester hour. Dr. Nutting and Dr. Pock are Professors of Law in the National Law Center.

*251 **Governmental Budgeting** (3) Stromsem, Posner

Survey of the basic concepts, principles, and practices in governmental budgeting; interrelationship of planning, programming, and budgeting, their role in the management process. (Fall and spring—evening)

252 **Problems in Planning, Programming, and Budgeting** (3) Chitwood

Intensive analysis of developments in federal planning, programming, and budgeting; application of new tools in the decision-making process; evaluation of the systems. (Fall and spring—evening)

254 **Seminar: Financial Management in the Federal Service** (3) Stromsem

Functions and interrelationships of central federal financial management agencies, their policy, economic and managerial roles, controllership functions, and standards and practices in financial management. (Spring—evening)

260 **Seminar: Policy Formulation and Administration** (3) Chitwood, Rosen

Analysis in depth of factors and processes involved in policy development with particular attention to selected areas of national policy; development of agency goals and objectives. (Fall and spring—evening)

261 **The Public and the Administrator** (3) Staff

Nature of the public interest, ways of determining public opinion, public opinion and the decision-making process, theories and methods of working with the public, interest groups, public relations and information programs.

262 **Seminar: Science, Technology, and Public Policy** (3) Rosen

The impact of science and technology upon public administration in terms of both administrative practice and national policies. (Spring—evening)

263 **Seminar: Regulation of Transportation I** (3) Hill

History of development of modes of transportation in the United States, economic problems and growth of regulatory legislation and philosophy, the congressional power to regulate; the scope of federal regulation; division of regulatory authority between federal and state governments; introduction to principles of certification and rate-making. (Same as Law 407 (2)).† (Fall—evening)

264 **Seminar: Regulation of Transportation II** (3) Hill

Principles of certification of rail, motor, water, and air carriers; elements and principles of rate-making; comparison of problems, procedures, and regulatory philosophies of the various regulatory agencies. (Same as Law 408 (2)).† (Spring—evening)

271 **Readings and Research in Public Administration** (3) Staff

Advanced directed readings and research in specific areas of public administration. (Fall and spring)

273 **Colloquium: Public Administration and American Political and Social Institutions** (3) Cloutier

Supervised study in depth of contemporary literature in selected fields, and of research methodology in public administration. Primarily for doctoral candidates. (Fall)

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* Special sections of this course offered in the Navy Graduate Financial Management Program.

† Students registering for P Ad 263 or 264 make special arrangements with instructor for supplementary assignments equivalent to one additional semester hour. Mr. Hill is Professorial Lecturer in Law in the National Law Center.

299 **Thesis Seminar** (3) **Sommers**

Examination of thesis standards, research philosophy and methodology. (Fall and spring—evening)

300 **Thesis Research** (3) **Staff**

(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) **Staff**

Limited to students preparing for the Doctor of Public Administration general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) **Staff**

Limited to Doctor of Public Administration candidates. May be repeated for credit. (Fall and spring)

Public and International Affairs*

Professors A.E. Burns, J.W. Brewer, H.M. Merriman, D.S. Watson, R.H. Davison, W.H. Kraus, R.B. Thompson, J.W. Kendrick, C.T. Stewart, Jr., H.L. LeBlanc, C.E. Galbreath, H.M. Stout, J.N. Mosél, W.C. Hopkins, F.H. Michael, R.E. Purcell, Joseph Aschheim, R.K. White, Benjamin Nimer, Helen Yakobson, R.P. Sharkey, Andrew Gyorgy, Mario Rodriguez, George Stambuk, H.C. Hinton, H.M. Sachar, Vladimir Petrov, B.M. Sapin, F.T. Peck *(Visiting)*, Kurt Wilk *(Visiting)*, Chung-wen Shih

Adjunct Professor C.B. Sargent

Professorial Lecturers Bela Maday, Joseph Baclawski, John Hardt, Tao-tai Hsia, Matthew Gallagher, L.C. Tihany, Bernard Gordon, Roman Kolkowicz, Bernard Ramundo, Lothar Metzl, T.M. Wolfe

Associate Professors P.P. Hill, Ching-Yao Hsieh, W.R. Johnson, S.I. Ploss *(Research)*, J.K. McDonald, J.A. Morgan, Jr., C.F. Elliott, R.Y.C. Yin, C.A. Moser, Bernard Reich, Richard Thornton, R.M. Dunn, Jr., John Hanessian, Jr., C.A. Linden

Adjunct Associate Professor Donald Robinson

Associate Professorial Lecturers Philip True, Alvin Richman

Assistant Professors G.C.Y. Wang, Anita Dasbach, D.L. Lee, S.J. Wayne, J.M. Logsdon

Assistant Professorial Lecturers Ming-jean Loh, R.R. Majak

Instructors K.L. Storrs, S.W. Burks

Bachelor of Arts in the field of Chinese Studies.—Prerequisite: the Chinese Studies curriculum, page 80, including Asia 5–6.

The general requirements are stated on pages 157–60. The 60 semester hours must include courses as described in I and II below.

I. Twenty-four semester hours of course work distributed as follows: (a) Asia 7 and 165 or 167; (b) Econ 169; (c) 6 hours selected from Hist 138, 187, 188, 195, 196 (either Hist 187 or 196, but not both, may be selected); (d) 6 hours selected from P Sc 101, 193, 194.

* Programs in Chinese Studies; International Affairs; Public Affairs; Russian Studies; and Science, Technology, and Public Policy are administered by the School of Public and International Affairs, B.M. Sapin, Dean.

II. Thirty-six semester hours chosen from (a), (b), or (c) below:

(a) Economics concentration—27 semester hours of approved Economics courses (including a 6-hour research and writing seminar) and 9 semester hours of electives selected from courses other than Economics, *or*

(b) History concentration—21 semester hours of approved History courses (including a 6-hour research and writing seminar) and 15 semester hours of electives selected from courses other than History, *or*

(c) Political Science concentration—24 semester hours of approved Political Science courses (including a 6-hour research and writing seminar) and 12 semester hours of electives selected from courses other than Political Science.

Bachelor of Arts in the field of International Affairs.—Prerequisite: the International Affairs curriculum, page 80.

The general requirements are stated on pages 157–60. The 60 required semester hours must include (1) Econ 181–82; 6 semester hours of foreign language composition and conversation: Hist 157, 182; P Sc 171, 181–82, 197; (2) 15 semester hours of electives; (3) 15 semester hours from one of the Group Options listed below:

Group I. International Politics—courses selected from Geog 125, 126, 127, 146; Hist 138, 139–40, 149, 183, 184; P Sc 107, 111, 112, 113, 117–18, 160, 167, 172, 196.

Group II. International Economics—courses selected from B Ad 175, 176, 177, 178; Econ 101, 102, 104, 121, 122, 134, 147; Geog 125, 126, 127, 132, 134; Stat 111, 112, 122.

Group III. International Communications—courses selected from Anth 150, 153, 157, 161, 162; Geog 125; Jour 145, 146; P Sc 146, 167; Psyc 115, 151, 156; Soc 144

Group IV. Regional Study with a concentration in one of the following areas: (1) Africa—courses selected from Anth 178, 179, P Sc 189, 190, 192, 196; (2) Europe—courses selected from Econ 147; Geog 153; Hist 131–32, 141–42, 147, 149, 151–52, 158, 162; P Sc 111, 112, 113, 117–18; (3) Far East—courses selected from Anth 173, 174, 175; Asia 165, 167; Econ 169; Hist 187, 188, 195–96; P Sc 101, 193, 194, 196; (4) Latin America—courses selected from Anth 170, 172; Econ 185–86, Geog 161; Hist 162, 163–64, 165, 166; P Sc 177, 178; interdisciplinary seminar 287 offered by six departments participating in the Latin American Studies program; (5) Middle East—courses selected from Anth 177; Hist 149, 158, 193, 194; P Sc 191, 192, 196; or (6) Soviet Orbit—courses selected from Econ 133, 134; Hist 138, 145–46, 188; P Sc 112, 115, 160, 161, 163; Slav 161–62, 165, 166, 194.

Bachelor of Arts in the field of Public Affairs.—Prerequisite: the Public Affairs curriculum, page 80.

The general requirements are stated on pages 157–60. The 60 required semester hours must include (1) Econ 102, 121, 161, 162; Hist 175–76; P Sc 121–22, 145, 151; (2) 18 semester hours of electives; (3) 12 semester hours from one of the Group Options listed below:

Group I. Economics—courses selected from Econ 101, 104, 122, 123, 136, 142, 165, 181–82.

Group II. Politics—courses selected from P Sc 103 or 104, 108, 111, 119–20, 125, 126, 146, 167, 199.

Group III. Urban Affairs—courses selected from B Ad 174, Econ 157, Educ 123, Geog 141, P Sc 103–4, Psyc 151, Soc 126.

Master of Arts in the field of International Affairs.—Prerequisite: a Bachelor's degree from an accredited college or university with background courses corresponding to an undergraduate major in International Affairs at this University.

Required: the general requirements, pages 161–64. The program of study consists of either (1) 24 semester hours of course work plus a thesis (equivalent to 6 additional semester hours) or (2) 36 semester hours of course work without a thesis.

The following specific requirements must be met for those students electing to write a thesis: (1) a scheduling of graduate courses amounting to 24 semester hours (no more than 15 semester hours in any one department), planned in consultation with the adviser on the basis of the student's selection from the following general, supple-

mentary, and regional studies—(a) International Politics, Comparative Government and Politics, Modern Political Theory (including Socialist and Communist Theory), and International Economics; (b) International Law, International Organization and Administration, International Economic Development, International Communications, International and Comparative Aspects of Communism, U.S. Diplomatic History, and U.S. Foreign Policy; (c) modern history, or government and politics, or economic history and problems of Western Europe, Eastern Europe, Soviet Union, Latin America, Middle East, Africa, South and Southeast Asia, and China; (2) P Sc 299–300 *Thesis Research* (3–3); and (3) a set of written examinations over three fields within the broad area of international affairs (the fields must represent at least two disciplines and include at least one general field).

The following specific requirements must be met for those students electing 36 semester hours without a thesis: (1) the course work must be designed to prepare the student for four comprehensive field examinations (as indicated under general, supplementary, and regional studies above); (2) the fields should represent at least two disciplines and one field should be general (no more than 21 semester hours of course work may be taken in any one department); and (3) at least two of the courses taken by the student should be *research seminars* requiring the preparation of a substantial research paper.

Master of Arts in the field of Public Affairs.—Prerequisite: a Bachelor's degree from an accredited college or university with an undergraduate major in public affairs, economics, history, or political science, depending upon the field of specialization in the Master's program.

Required: the general requirements, pages 161–63, 165. The program of study consists of either (1) 24 semester hours of course work plus a thesis (equivalent to 6 additional semester hours) or (2) 36 semester hours of course work without a thesis. The required courses (exclusive of P Sc 299–300) are to be selected from one of the following fields of specialization: Domestic Economics (courses in economic development, economic policy, public finance, and national income); Domestic Politics (courses in U.S. social, constitutional, and political history; comparative government; political theory; the American Presidency; legislative organization; jurisprudence; political parties; and public opinion).

Master of Arts in the field of Russian Studies.—Prerequisite: a Bachelor's degree from an accredited college or university with an undergraduate major in a pertinent field. The undergraduate program should have included the following courses, or equivalent: Hist 145–46; P Sc 112 or 161; Slav 1–2 and 3–4, or 5–6.

Required: the general requirements, pages 161–63, 165. The program of study consists of either (1) 24 semester hours of course work plus a thesis (equivalent to 6 additional semester hours) or (2) 36 semester hours of course work without a thesis. The required courses are Econ 133; Hist 237, 245; P Sc 224, 229, 269; Slav 161–62, or 165 and 166; and if a thesis is elected, *Thesis Research* (299–300). With the exception of thesis, students may, with the approval of the adviser, substitute alternate courses. The thesis should be interdisciplinary in approach.

Master of Arts in the field of Science, Technology, and Public Policy.—Prerequisite: a Bachelor's degree from an accredited college or university with an undergraduate major in a social, life, or physical science, or in engineering.

Required: the general requirements, pages 161–63, 165. The program of study consists of either (1) 24 semester hours of course work plus a thesis (equivalent to 6 additional semester hours) or (2) 36 semester hours of course work without a thesis. The required courses are P Sc 205, P Sc 206 or 208, P Sc 299–300 (if a thesis is elected), and a course in methods for the analysis of public policy. The remainder of the required courses, chosen in consultation with the student's adviser, should be distributed over two fields if a thesis is elected, or over three fields if a thesis is not elected.

Master of Science in International Affairs.—Offered in off-campus programs at the National War College, Fort McNair, Washington, D.C., and the Naval War College, Newport, R.I.

Religion

Professor R.G. Jones *(Chairman)*
Associate Professors H.E. Yeide, Jr., Dewey Wallace, Jr.
Assistant Professors Sonya Quitslund, A.J. Hiltebeitel
Assistant Professorial Lecturer M.S. Halpern

Bachelor of Arts with a major in Religion (Field-of-Study).—Prerequisite: the Arts and Letters curriculum, page 76, including Rel 9, 10, and 59–60.

Required: the general requirements, pages 81–85, and the passing of the Religion major examination at the end of the senior year. The coordinated field of knowledge upon which the student will be examined includes the history and literature of the world's religions and the philosophical and ethical problems of religious thought. A student may elect to give special emphasis in his program to Christianity, Judaism, or the religions of India. A proseminar (Rel 199–200) assists the student in preparing for the major examination. A pamphlet containing a detailed description of the major is available in the offices of the Dean of Columbian College of Arts and Sciences and the Chairman of the Department of Religion.

Master of Arts in the field of Religion.—Prerequisite: the degree of Bachelor of Arts with a major in Religion from this University, or an equivalent degree.

Required: the general requirements, pages 90–96. Of the 24 semester hours of required courses (exclusive of the thesis) at last 12 must be in third-group Religion courses; a maximum of 9 may be in a closely related field outside the Department of Religion as approved by the Department. The Master's Comprehensive Examination must cover three fields (the thesis research must be on one of these three fields) selected from the following: the Old Testament, the New Testament, History of Christianity, History of Religion in America, Modern Religious Thought, Ethics, Sociology of Religion, and History of Religions. A reading knowledge examination, usually in French or German, is required; however, Hebrew or Greek is acceptable for those students whose thesis area is in the Biblical field and Sanskrit or an Eastern language for those whose thesis area is in the History of Religions.

Master of Arts in the field of Religious Education.—Prerequisite: the degree of Bachelor of Arts with a major in Religion from this University, or an equivalent degree. The undergraduate program should have included the following courses or equivalent: Anth 1; Educ 108; Psyc 1, 22, and 29; Sp&D 1 or 11.

Required: the general requirements, pages 90–96. Of the 24 semester hours of required courses (exclusive of the thesis), at least 6 must be in third-group Religion courses; a maximum of 12 may be in a closely related field outside the Department of Religion as approved by the Department.

*Master of Arts in the field of Religion and Medical Care**.—Prerequisite: the degree of Bachelor of Arts with a major in Religion from this University, or an equivalent degree.

Required: the general requiremnts, pages 90–96. The program of study consists of 36 semester hours of approved course work with or without a thesis. Students must elect course work covering four fields selected from Clinical Pastoral Care, Religion, Sociology, Psychology, Health Care Administration, and Medicine. The course work in these fields must be distributed as follows: 12 semester hours each selected from two fields and at least 6 hours in Clinical Pastoral Care. The Master's Comprehensive Examination must cover three fields selected from the list above, one of which, as approved by the Department, must be outside of the Department of Religion. Clinical training may be offered as a tool subject in lieu of the required reading knowledge examination in a foreign language.

Doctor of Philosophy in the field of American Religious History (offered in cooperation with the Department of History).—Required: the general requirements,

* Certain courses in this program are offered only through Off-campus Centers of the College of General Studies

pages 90–94, 96–98. The General Examination must cover four fields, including two from the Department of Religion (History of Religion in America and either Early Christianity or European Christianity since 1500) and two from the Department of History (generally American Social History and one other).

FIRST GROUP

9 **The Old Testament** (3) Jones, Quitslund

Historical and literary study of the Old Testament with consideration of development of religious ideas, institutions, and outstanding personalities. (Fall—day and evening)

10 **The New Testament** (3) Jones, Quitslund

Study of New Testament literature from the standpoint of occasion, purpose, dominant ideas, and permanent values. Emphasis on approach, structure, and significance of the Gospels and Epistles. (Spring—day and evening)

21 **Introduction to Religious Thought** (3) Yeide

Traditional religious concepts, language of contemporary religion amidst modern scientific and secular intellectual tendencies, and the place of religion in today's society. (Fall and spring—day)

59–60 **History of Religions** (3–3) Wallace, Hiltebeitel, Quitslund

Origins, evolution, and contemporary status in historical context. Rel 59: primitive religion and the religions of the East (Hinduism, Buddhism, Taoism, Confucianism, Shinto). Rel 60: religions of the West and Near East (ancient religions, Judaism, Christianity, Islam). (Rel 59: fall—day and evening; spring—day. Rel 60: fall—day; spring—day and evening.)

SECOND GROUP

103 **The Prophets** (3)

Development of prophetism in the Old Testament; cultural, economic, psychological, and religious factors; elements of lasting value in the prophetic teaching. Study of selected prophets.

104 **The Life and Thought of Jesus** (3) Quitslund

Comprehensive study of the life and teachings of Jesus with critical attention to sources. (Spring—day)

105 **The Life and Thought of Paul** (3)

Backgrounds of early Christianity, first-century religious and social conditions affecting the spread of Christianity, the life and journeys of Paul, Paul's presentation of the Christian faith.

122 **Christian Ethics and Modern Society** (3) Yeide

Nature and principles of Christian life as developed by the Christian community; problems of personal conduct; application to family, social, and economic institutions. (Fall—day)

124 **Contemporary Movements in Theology** (3) Quitslund

Theological approach and systems of a selected number of modern theologians. (Spring—day)

127 **Medicine, Religion, and Healing** (1) Staff

Primarily for second-year students in the School of Medicine; open to Religion majors with the approval of the instructor. Introduction to the total care concept emphasizing the importance of religion in medical practice for patient and physician. Concept of the professional man, the clergy's role in healing, Jewish and Christian faiths and their attitudes in problem areas. Case studies. (Spring—day)

131 **History of Christianity to the Reformation** (3) Wallace

Rise and expansion of Christianity, development of Christian thought, and evolution of church organization and worship. (Fall—day)

132 **History of Modern Christianity** (3) Wallace

Origin and development of Protestantism; Roman Catholic revival; status of Eastern churches; doctrines, worship, expansion, church and state, and relation to modern thought and life. (Spring—day)

135 **History of Judaism to the Talmud** (3) Halpern

History and religious thought of the Jewish people from the Maccabean revolt to the compilation of the Talmud. (Fall—day)

136 **History of Medieval and Modern Judaism** (3) Halpern

History and religious thought of the Jewish people from the compilation of the Talmud to the present. (Spring—day)

137 **The Land of Israel and the Growth of the Western Religions** (6) Jones, Halpern

141–42 **Religious Education** (3–3)

Religious education in the home, church, and community; basic educational procedures and special techniques; organization and administration of religious education.

159 **Hinduism** (3) Hiltebeitel

Emergence of the structures of Hindu life and thought out of ancient Vedic religion, religious philosophy, role of Hinduism in Indian civilization. (Fall—day)

160 **Buddhism** (3) Hiltebeitel

Origin, development, and contemporary status of Buddhist life and thought; its impact on Asian civilization. (Spring—evening)

161 **Islam** (3) Staff

Origin, development, and contemporary status of Islamic life and thought; its impact on the Near East. (Fall—evening)

162 **Symbolism in the History of Religions** (3) Hiltebeitel

Religious symbolism, myth, legend, and ritual in the religions of the world; various theoretical analyses. (Spring—evening)

172 **Religion in American Culture** (3) Wallace

Growth of religious bodies and institutions in relation to American culture, development of religious thought, and analysis of the contemporary religious scene. (Fall—day)

199–200 **Proseminar: Readings for the Major** (3–3) Staff

Readings and group discussions. (Academic year)

THIRD GROUP

209–10 **Seminar: Biblical Studies** (3–3)

Main problems of Biblical literary, historical, and theological criticism.

213 **Seminar: Inter-testamental Judaism** (3) Jones

Historical and religious development of Judaism as seen in the Apocrypha, Pseudepigrapha, Dead Sea Scrolls, Philo, and early Rabbinism. (Fall—evening)

222 **Seminar: Christian Ethics** (3) Yeide

Important tendencies in ethical reflection of the contemporary Christian Church; contributions of social sciences to that reflection. (Spring—evening)

*225 **The Dynamics of Ministering to the Young Adult** (3)

Conceptual models of development of young adults from late adolescence; special problems of educational and military experience, vocational choice, marriage and the family, and physical, intellectual, emotional, and religious development. Encounter experience with persons and groups.

*227–28 **Advanced Studies in Pastoral Care** (3–3)

History and present state of methodologies and conceptual models of pastoral counseling and leadership in groups; supervised work in interfaith and multidisciplinary ministries.

*230 **Supervised Clinical Pastoral Training** (6) Staff

Four-hundred-hour program of pastoral care of hospital patients; preparation of case studies; study of psychosocial development, dynamics of illness, classic approaches to healing; integration of insights of theology and social and behavioral sciences. (Fall and spring—day)

231 **Seminar: Early Christianity** (3) Jones

(Formerly Rel 231–32 Seminar: Early and Medieval Christianity (3–3))

Selected topics.

232 **Seminar: Christianity since 1500** (3)

(Formerly Rel 233–34 Seminar: Reformation and Modern Christianity (3–3))

Selected topics.

235 **Seminar: Roman Catholicism in the Modern World** (3)

Important leaders and their ideas in selected developments since 1500—doctrinal, spiritual, biblical, liturgical, and ecumenical.

237 **Seminar: Theological Analysis** (3) Quitslund

Historical and topical study of the development of important ideas in such areas as Christology, soteriology, and ecclesiology. (Fall—evening)

241–42 **Seminar: Religious Education** (3)

Major problems in the practice of religious education.

262 **Seminar: History of Eastern Religions** (3) Hiltebeitel

Selected topics. (Spring—evening)

* Offered through the College of General Studies at the National Naval Medical Center for students in the Master's degree program in the field of Religion and Medical Care.

271 **Seminar: American Religious History to 1830** (3)
Religious thought and life during the Colonial and early National period. (Fall—day)

273 **Seminar: American Religious History since 1830** (3) Wallace
Religious thought and life from the antislavery movement to the present.

291–92 **Readings and Research** (3–3) Staff
Investigation of special problems. (Academic year)

299–300 **Thesis Research** (3–3)
(Fall and spring)

Romance Languages and Literatures

Professors Rafael Supervía, J.W. Robb, G.E. Mazzeo, J.A. Frey, J.L. Métivier, Jr., J.F. Burks *(Chairman)*
Associate Professors Mary Ann Coffland, J.D. Vedvik, Pilar Sáenz
Assistant Professors Elizabeth Neyman, G.P. Huvé, Julia Hicks, Dorothy Betz, Charles Mudge, Maria Wilmeth, Anne-Marie Schmutz
Assistant Professorial Lecturer Esther Lawton
Director of Language Laboratories W.M. Kincaide

Bachelor of Arts with majors in (1) *French Language and Literature,* (2) *Spanish American Literature,* and (3) *Spanish Language and Literature (Field-of-Study).*—Prerequisite: the Arts and Letters curriculum, page 76.

Required: the general requirements, pages 81–85, and the passing of the major examination at the end of the senior year. The coordinated field of knowledge upon which the student will be examined includes the political, social, and cultural backgrounds of the literature studied; the writers and their works. Proficiency in the spoken and written language is required. Majors in Romance Languages are strongly advised to study Latin, a knowledge of which is generally required for graduate work. A proseminar in each of the major fields assists the student in his preparation for the major examination.

Master of Arts in the fields of (1) *French Language and Literature,* (2) *Spanish American Literature,* and (3) *Spanish Language and Literature.*—Prerequisite: the degree of Bachelor of Arts in the appropriate field from this University, or an equivalent degree.

Required: the general requirements, pages 90–96. The program of study consists of 24 semester hours of approved course work plus a thesis (equivalent to 6 semester hours), or with the approval of the Department a student may elect a program of study consisting of 36 semester hours of approved course work without a thesis.

Doctor of Philosophy fields of study in Romance Languages and Literatures.—Required: the general requirements, pages 90–94, 96–98. There are four fields (1) French Literature (Old and Middle, Renaissance, 17th Century, 18th Century, 19th Century, Modern); (2) Spanish Literature (Old, Medieval, Literature of the *Siglo de Oro,* 18th Century, 19th Century, Contemporary); (3) Spanish American Literature; and (4) Philology.

Bachelor of Arts in Education with teaching fields in French and in Spanish.—Prerequisite: the Education curriculum, pages 78–79.

Required: the French option or the Spanish option and the professional courses listed on pages 109, 113–14, 115.

Placement Examination: A standardized placement examination given before registration is required of all entering students who wish to continue in college the language begun in high school. Upon completion of the examination, assignment is made to the appropriate course, with credit assigned on the usual basis.

FRENCH

Departmental prerequisite: Fren 3–4 or 6, or equivalent, is required (Fren 51–52 or 91–92 is recommended) as prerequisite to all second-group courses in French.

FIRST GROUP

1–2 First-year French (3–3) — Mudge and Staff

A year course: credit toward a degree at this University given on completion of Fren 2. For beginners. Pronunciation, conversation, grammar, composition, reading of modern French prose. Aural training, oral practice in language laboratory. Laboratory fee, $17.50 a semester. (Fren 1 and 2: fall and spring—day and evening)

2x First-year French (3) — Betz and Staff

Intensive course to which are assigned entering students whose placement tests show them inadequately prepared for the regular work of Fren 3. Meets 6 hours a week (3 hours of lecture, 2 hours of drill, 1 hour of laboratory) and carries 3 semester hours of credit. Fee, $247 (tuition fee of $222 plus additional fee of $25) plus laboratory fee, $17.50. (Fall—day)

3–4 Second-year French (3–3) — Vedvik and Staff

A year course: credit toward a degree at this University given on completion of Fren 4. Conversation, grammar, composition, reading in modern French prose, introduction to French civilization. Aural training, oral practice in language laboratory. Prerequisite: Fren 1–2, 2x, or two years of high school French. Laboratory fee, $17.50 a semester. (Fren 3 and 4: fall and spring—day and evening)

6 Second-year French (6) — Vedvik and Staff

Lecture (3 hours), discussion (3 hours). Intensive course which covers material of Fren 3–4. Grammar review, reading, conversation. Prerequisite: two years of high school French with grades of *B* or better; Fren 2 or 2x. (Spring—day)

9–10 French Conversation and Composition (3–3) — Huvé and Staff

Prerequisite: Fren 4 or equivalent and permission of instructor. (Fren 9: fall—day and evening; spring—day. Fren 10: fall—day; spring—day and evening.)

12 French Conversation and Composition (Intensive) (6) — Huvé and Staff

Intensive course which covers material of Fren 9–10. Laboratory fee, $25.

49 French for Graduate Students (0) — Lawton and Staff

For graduate students preparing for reading examinations. No academic credit. Tuition fee, $222. (Fall and spring—evening)

51–52 **Survey of French Literature** (3–3) Métivier and Staff

Readings in French literature from the Middle Ages to the present. Lectures, readings, recitations, and informal discussions. (Fren 51: fall—day and evening; spring—evening. Fren 52: fall and spring—day)

91–92 **Analyse de texte** (3–3) Burks and Staff

Methodology and vocabulary of literary criticism; application of principles of *explication de texte* to selections from prose, drama, and poetry from the Renaissance to the present. (Academic year—day)

SECOND GROUP

103 **Pronunciation and Intonation** (3) Huvé

Recommended for majors. (Fall and spring—day)

108 **Cours avancé de grammaire** (3) Mudge

(Spring—day)

109–10 **Advanced French Conversation and Composition** (3–3) Huvé

Fren 109: emphasis on diction. Fren 110: emphasis on style. Prerequisite: Fren 10 or equivalent and permission of instructor. (Academic year—day)

119–20 **French Literature of the Middle Ages and the Renaissanse** (3–3) Métivier

Literary history and the development of ideas. *Les chansons de geste*, courtly literature, satire, the theater, lyric and didactic poetry: Rabelais, Montaigne, La Pléiade. Class analysis of texts, collateral readings. (Academic year—day)

121–22 **17th Century French Literature** (3–3) Vedvik

History, philosophy, criticism, memoirs, letters, eloquence, drama, fiction, poetry. Class analysis of texts; collateral readings.

123–24 **18th Century French Literature** (3–3) Schmutz

History, philosophy, criticism, letters, drama, fiction, poetry, the "salons," idea of progress, idea of science. Class analysis of texts, collateral reading. (Academic year—day)

125–26 **19th Century French Literature** (3–3) Betz, Frey

Poetry, drama, and novel of the 19th century with emphasis on stylistic analysis. (Academic year—evening)

127–28 **20th Century French Literature** (3–3) Coffland

Fiction, poetry, and drama from 1900 to present. Chronological examination of authors, movements. (Academic year—day)

129–30 **Contemporary French Literature** (3–3) Frey, Burks

193 **Cours de style** (3) Mudge

Advanced grammar, composition, and stylistics. Open to both advanced undergraduate and graduate students. Recommended for majors and teachers of French.

199–200 **Proseminar: Readings for the Major** (3–3) Staff

Conferences and group discussions. (Academic year—day)

THIRD GROUP

202 **Thème et Version** (3) Schmutz

Limited to students in the Graduate School of Arts and Sciences; open to others only by permission of the graduate adviser. Required of all graduate students in the field of French Language and Literature. Analysis and translation of selected prose passages, alternating between French and English; designed to teach students to write with precision and clarity. (Fall—day)

212 **Historical French Grammar** (3) Staff

Phonology, morphology, and syntax of Old French; its development from Vulgar Latin. Prerequisite: a second-group course in French literature. Knowledge of Latin useful.

213–14 **Medieval French Literature** (3–3) Staff

French literature to the end of the Middle Ages. Prerequisite: a second-group course in French literature. (Academic year—day)

221 **Special Problems in 16th Century French Literature** (3) Burks

(Formerly Fren 224 Seminar: the Age of Rabelais)

Topic for 1971-72: Rabelais. (Fall—day)

226 **16th and 17th Century Philosophical Literature** (3) Burks

The emergence of a literature of ideas; emphasis on the thought of Calvin, Montaigne, Descartes, and Pascal. (Spring—day)

229–30 **Literary Renaissance in Europe** (3–3) Burks

(Replaces former Fren 228 Seminar: the Literary Renaissance in Europe (3))

Study of the developments in the poetry of Italy, France, and England.

231–32 **Theater in the 17th Century** (3–3) Vedvik

Survey of the development of theatrical arts and the drama. Research papers and reports.

234 **17th Century Nondramatic Literature** (3) Vedvik

Rationalism and the revolt against authority expressed in literature. Impact of nondramatic literature on the development of classical doctrine. (Fall—day)

241 **The Rationalistic Current in the 18th Century** (3) Schmutz

The contribution of the *philosophes* to the intellectual evolution of France and Europe. (Spring—day)

242 **Seminar: the French Novel in the 18th Century** (3) Schmutz

244 **Special Problems in 18th Century French Literature** (3) Schmutz

253 **Special Problems in 19th Century French Literature** (3) Frey

(Formerly Fren 257 Special Problems in the 19th Century Novel)

Topic for 1971-72: Fin de siècle drama. (Spring—day)

256 **19th Century French Literature** (3) Frey

258 **Special Problems in 19th Century French Poetry** (3) Frey

264 **Seminar: Modern Period** (3) Coffland

Topic for 1971–72: the believer as novelist—Gide, Mauriac, Bernanos. (Fall—day)

265 **20th Century French Theater** (3) Coffland

266 **20th Century French Poetry** (3) Coffland

Background and development of poetry in the 20th century; *explication de texte* approach.

295 **Independent Reading and Research in French Literature** (arr.)

For students preparing for the Master of Arts degree. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

ITALIAN

FIRST GROUP

1–2 **First-year Italian** (3–3) Wilmeth and Staff

A year course: credit toward a degree at this University given on completion of Ital 2. For beginners. Pronunciation, conversation, grammar, composition, reading of modern Italian prose. Aural training, oral practice in language laboratory. Laboratory fee, $17.50 a semester. (Academic year—day)

3–4 **Second-year Italian** (3–3) Wilmeth and Staff

A year course: credit toward a degree at this University given on completion of Ital 4. Conversation, grammar, composition, reading in modern Italian prose, introduction to Italian civilization. Aural training, oral practice in language laboratory. Prerequisite: Ital 1–2 or two years of high school Italian. Laboratory fee, $17.50 a semester. (Academic year—day)

9–10 **Italian Conversation and Composition** (3–3) Wilmeth

Prerequisite: Ital 4 or equivalent and permission of instructor. (Academic year—day)

51–52 **Introduction to Italian Literature** (3–3) Wilmeth

Prerequisite: Ital 4 or equivalent. (Academic year—day)

THIRD GROUP

295 **Independent Reading and Research in Italian Literature** (arr.)
For students preparing for the Master of Arts or Doctor of Philosophy degree. May be repeated for credit. (Fall and spring)

SPANISH

Departmental prerequisite: Span 3–4 or 6, or equivalent, is required (Span 51–52 or 91–92 is recommended) as prerequisite to all second-group courses in Spanish.

FIRST GROUP

1–2 **First-year Spanish** (3–3) **Hicks and Staff**
A year course: credit toward a degree at this University given on completion of Span 2. For beginners. Pronunciation, conversation, grammar, composition, reading of modern Spanish prose. Aural training, oral practice in language laboratory. Laboratory fee, $17.50 a semester. (Span 1 and 2: fall and spring—day and evening)

2*x* **First-year Spanish** (3) **Hicks and Staff**
Intensive course to which are assigned entering students whose placement tests show them inadequately prepared for the regular work of Span 3. Meets 6 hours a week (3 hours of lecture, 2 hours of drill, 1 hour of laboratory) and carries 3 semester hours of credit. Fee, $247 (tuition fee of $222 plus additional fee of $25) plus laboratory fee, $17.50. (Fall—day)

3–4 **Second-year Spanish** (3–3) **Hicks and Staff**
A year course: credit toward a degree at this University given on completion of Span 4. Conversation, grammar, composition, reading of modern Spanish prose, introduction to Hispanic civilization. Aural training, oral practice in language laboratory. Prerequisite: Span 1–2, 2*x*, or two years of high school Spanish. Laboratory fee, $17.50 a semester. (Span 3 and 4: fall—day; spring—day and evening)

6 **Second-year Spanish** (6) **Neyman**
Lecture (3 hours), discussion (3 hours). Intensive, accelerated course which covers material of Span 3–4. Grammar review, reading, conversation. Prerequisite: two years of high school Spanish with grades of *B* or better, or grades of Honors or High Pass in Span 2 or 2*x*. (Spring—day)

9–10 **Spanish Conversation and Composition** (3–3) **Hicks and Staff**
Prerequisite: Span 4 or equivalent and permission of instructor. (Span 9 and 10: fall and spring—day)

12 **Spanish Conversation and Composition (Intensive)** (6) **Staff**
Intensive, accelerated course which covers the material of Span 9–10. Laboratory fee, $25.

49 **Spanish for Graduate Students** (0) **Hicks**
For graduate students preparing for reading examinations. No academic credit. Tuition fee, $222. (Fall and spring—evening)

51–52 **Survey of Spanish Literature and Civilization** (3–3) Supervía
Social, artistic, and cultural background of Spanish literature. Lectures, readings, recitations, and informal discussions. (Academic year—day)

91–92 **Explicación de textos** (3–3) Sáenz
Analytical introduction to Spanish and Spanish American literature. Method demonstrated and practiced on selected passages. (Academic year—day)

SECOND GROUP

109–10 **Advanced Spanish Conversation and Composition** (3–3) Mazzeo
Emphasis on diction and style. Prerequisite: Span 10 or equivalent and permission of instructor. (Academic year—day)

119–20 **Medieval Spanish Literature** (3–3) Neyman
Survey by genre of the literature of the Middle Ages.

121–22 **Spanish Literature of the Golden Age** (3–3) Staff
Span 121: development of the Spanish drama from its origins to 1680, emphasis on Lope de Vega; the evolution of Spanish poetry. Span 122: origins and development of the novel in the Golden Age, emphasis on the picaresque. (Academic year—day)

123–24 **Cervantes: Don Quijote** (3–3) Staff
Cervantes' literary theories as reflected in the *Novelas Ejemplares* and the *Quijote*. The *Quijote* as a panorama of the social, political, and religious problems in the Spain of Cervantes.

125–26 **Modern Spanish Literature** (3–3) Mazzeo
Prose, poetry, and drama of the 18th and 19th centuries. Class analysis of texts, collateral reading, lectures on literature and history.

127–28 **Contemporary Spanish Literature** (3–3) Supervía
Prose and poetry of the 20th century. Class analysis of texts, collateral reading, lectures on literature and history. (Academic year—day)

129 **The Romantic Drama in Spain** (3) Mazzeo
Lectures on the Spanish Romantic Drama, class analysis of representative plays, collateral readings.

130 **The Modern Spanish Essay** (3) Mazzeo
Development of the Spanish essay from the 16th century; emphasis on the 18th and 19th centuries. Class analysis of texts, collateral reading, and lectures.

131 **The Generation of 1898** (3) Supervía
Study of the various critical problems related to this renaissance of Spanish letters as a whole, and of its most representative figures and works.

135 **The Spanish Theater of the Realist Period** (3)
Study and analysis of the works of Ventura de la Vega, López de Ayala, Tamayo y Baus, Echegaray, and Pérez Galdós.

141 **Introduction to Spanish American Literature** (6) Robb

Highlights of Spanish American literature through the colonial and modern periods. Given in English, with readings in Spanish. Of special interest to majors in Latin American Studies.

151–52 **The Spanish American Novel** (3–3) Robb

Development of the novel in Spanish America. Lectures, collateral reading, and class analysis of texts. (Academic year—evening)

155–56 **Spanish American Literature to 1880** (3–3) Robb

Literature of Spanish America from the colonial period to the latter part of the 19th century. Lectures, collateral reading, reports, and class analysis of important works.

157–58 **Spanish American Literature since 1880** (3–3) Robb

Literature of Spanish America from 1880 to the contemporary period. Lectures, collateral reading, reports, and class analysis of important works.

193 **Curso de estilo** (3) Staff

Advanced grammar, composition, and stylistics. Open to both advanced undergraduate and graduate students. Recommended for majors and teachers of Spanish.

197–98 **Proseminar: Readings for the Major in Spanish American Literature** (3–3) Robb

Recommended for all majors. Conferences and group discussions. (Academic year)

199–200 **Proseminar: Readings for the Major in Spanish Language and Literature** (3–3) Mazzeo, Sáenz

Recommended for all majors. Conferences and group discussions. (Academic year—day)

THIRD GROUP

215–16 **Old Spanish** (3–3) Staff

Span 215: phonetics, literature. Span 216: morphology, literature. (Academic year—day)

221 **Seminar: Cervantes' Don Quijote** (3) Staff

224 **Seminar: Problems in Spanish Renaissance Literature** (3) Staff

(Fall—day)

225 **Seminar: Special Problems in Golden Age Literature** (3) Staff

231 **Seminar: 18th Century Spanish Writers** (3) Mazzeo

Lectures and analysis of principal authors and works; relationships with subsequent literary movements. (Fall—day)

242 **Seminar: Spanish Romanticism** (3) Mazzeo

Lectures and analysis of principal authors and works. Collateral readings. Problems of origins and developments. (Spring—day)

244 **Seminar: Naturalism and the Spanish Novel** (3) Mazzeo

Development of Naturalism in 19th century Spain. Analysis of representative works of Pardo Bazán, Clarín, Blasco-Ibáñez, and others.

245–46 **Seminar: Works of Galdós** (3–3) Supervía
Ideological and stylistic analysis: relationship of his works to literary movements of the second half of the 19th century.

248 **Seminar: Spanish Lyric Poetry** (3) Sáenz

251 **Seminar: Works of Unamuno and Ortega y Gasset** (3) Supervía
Study of their thought; analysis and commentary on the texts. (Fall—day)

252 **Spanish Literature since the Civil War** (3) Sáenz

253 **Seminar: Studies in Modern Spanish American Poetry** (3) Robb
(Fall—day)

255 **Seminar: Studies in 20th Century Spanish American Theater** (3) Robb

256 **Seminar: Studies in Mexican Narrative Prose** (3) Robb
(Spring—day)

261 **Seminar: Studies in Spanish American Essayists** (3) Robb
The Spanish American essay as an artistic form; selected modern essayists.

264 **Seminar: Studies in Recent Spanish American Fiction** (3) Robb

266 **Seminar: Alfonso Reyes** (3) Robb
Alfonso Reyes, the essayist-artist, poet, and complete humanist, as studied in his various prose and poetic works.

287 **Seminar: Problems in Latin American Civilization** (3) Rodríguez
Interdisciplinary seminar guided by a specialist within the methodology of his chosen discipline; each student writes a report on some aspect of a key theme (i.e., Nationalism) in Latin America's experience. Admission by permission of instructor. (Spring—day)

295 **Independent Reading and Research in Spanish and Spanish American Literature** (arr.) Staff
For students preparing for the Master of Arts degree. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Sino-Soviet Studies

See "Institute for Sino-Soviet Studies."

Slavic Languages and Literatures

Professor Helen Yakobson
Associate Professors Nadine Natov-Popluiko, C.A. Moser *(Chairman)*, G.A. Olkhovsky, W.W. Rowe
Associate Professorial Lecturer Juri Jelagin
Assistant Professors M.A. Kandel, Irene Thompson, Mary Miller

Bachelor of Arts with a major in Russian Language and Literature (Field-of-Study.)—Prerequisite: the Arts and Letters curriculum, page 76.

Required: the general requirements, pages 81–85, and the passing of the major examination at the end of the senior year. The coordinated field of knowledge upon which the student will be examined includes the political, cultural, and social backgrounds of Russian literature; Russian cultural history; the Russian language—its structure and usage. Proficiency in spoken and written Russian language is required. Students who are already proficient in Russian may, upon passing an appropriate examination, waive any or all of the first-group language courses, as well as up to 6 hours of second-group language courses. The Department provides a proseminar intended to assist the student in his preparation for the major examination.

Master of Arts in the field of Russian Language and Literature.—Prerequisite: the degree of Bachelor of Arts with a major in Russian Language and Literature from this University, or an equivalent degree. Students electing a concentration in Russian literature must have a knowledge of the Russian language and a general acquaintance with 19th and 20th century Russian literature. Students electing a concentration in Russian language and language teaching must have a general knowledge of the structure of the Russian language, proficiency in oral and written expression, an acquaintance with 19th and 20th century Russian literature, and a knowledge of Russian cultural history; a course in general linguistics is also recommended.

Required: the general requirements, pages 90–96. The program of study consists of 24 semester hours of approved course work plus a thesis (equivalent to 6 semester hours) or 36 semester hours of approved course work without a thesis. Candidates electing the Russian literature concentration must include 6 semester hours of linguistics and at least 18 hours of literature; candidates electing the Russian language and language teaching concentration must include 6 semester hours of literature and at least 18 hours of language and linguistics. All candidates must pass a reading knowledge examination in either French or German and must pass a Master's Comprehensive Examination in their area of concentration.

Bachelor of Arts in Education with a teaching field in Russian.—Prerequisite: the Education curriculum, pages 78–79.

Required: the Russian option and the professional courses listed on pages 112–13, 115.

Placement Examination: A standardized placement examination given before registration is required of all entering students who wish to continue in college the language begun in high school. Upon completion of the examination, assignment is made to the appropriate course, with credit assigned on the usual basis.

FIRST GROUP

1–2 **First-year Russian** (3–3) Yakobson and Staff

A year course: credit toward a degree at this University given on completion of Slav 2. Beginners' course in fundamentals of grammar and pronunciation with graded reading, oral drill, and written practice. Listening comprehension and oral practice in language laboratory. Laboratory fee, $17.50 a semester. (Slav 1 and 2: fall and spring—day and evening)

3–4 **Second-year Russian** (3–3) Yakobson and Staff

A year course: credit toward a degree at this University given on completion of Slav 4. Systematic review of grammar. Study of special problems of Russian morphology and syntax. Oral and written reports on assigned topics. Prerequisite: Slav 1–2 or two years of high school Russian. Laboratory fee, $17.50 a semester. (Slav 3: fall—day and evening; spring—evening. Slav 4: fall—evening; spring—day and evening)

5–6 **Intensive Beginning Russian** (6–6) Thompson

Classroom (10 hours), laboratory (1 hour). Beginners' intensive course in the fundamentals of Russian phonology, structure, and vocabulary. Emphasis on active command of the spoken and written language. Maximum participation on the part of the student. Drill sessions to facilitate aural comprehension and oral expression. Graded reading and written practice. Listening comprehension and oral practice in language laboratory. Prerequisite to Slav 6: Slav 2 or 5. Laboratory fee, $17.50 a semester. (Academic year—day)

7–8 **Intensive Advanced Russian** (6–6) Miller, Olkhovsky

Classroom (10 hours), laboratory (1 hour). Emphasis on vocabulary expansion. Systematic review of Russian grammar at an advanced level. Reading and discussion of literary texts, periodicals, and selected texts in social sciences. Oral reports and compositions on assigned topics. Listening comprehension practice in language laboratory. Prerequisite to Slav 7: Slav 4 or 6, or equivalent. Prerequisite to Slav 8: Slav 7. Laboratory fee, $17.50 a semester. (Academic year—day)

9–10 **Russian Conversation and Composition** (3–3) Staff

Listening comprehension; oral and written practice. Prerequisite: Slav 4 or 6, or permission of instructor. Laboratory fee, $17.50 a semester. (Academic year—evening)

31–32 **Elementary Polish** (3–3) Staff

A year course: credit toward a degree at this University given on completion of Slav 32. Beginners' course in the fundamentals of grammar and pronunciation; graded reading, oral drill, and written practice. Listening comprehension and oral practice in language laboratory. Laboratory fee, $17.50 a semester. (1972–73 and alternate years: academic year—evening)

41–42 **Elementary Serbo-Croatian** (3–3) Staff

A year course: credit toward a degree at this University given on completion of Slav 42. Beginners' course in the fundamentals of grammar and pronunciation; graded reading, oral drill, and written practice. (1971–72 and alternate years: academic year—evening)

47 **Beginning Russian for Reading Examination Candidates** (0) Staff

For graduate students with little or no knowledge of Russian who intend to use the language as a research tool. No academic credit. Tuition fee, $222. (Fall—evening)

49 **Russian Readings for Nonmajor Students** (3) Staff

Primarily for graduate students preparing for reading examinations. Undergraduates admitted with permission of instructor. No academic credit for graduate students. Prerequisite: Slav 4, 6, or 47; or equivalent. (Spring—evening)

91–92 **Introduction to Russian Literature** (3–3) Staff

Survey of Russian literature, in translation, from earliest periods through literary masterpieces of the 19th and 20th centuries. Lecture, recitation, and discussion—in English. Term paper required. (Slav 91 and 92: fall and spring—day)

SECOND GROUP

101–2 **Readings in Modern Russian** (3–3) Olkhovsky

Representative reading and translation of Soviet periodicals and selected texts in social sciences. Study of current political terminology, abbreviations, Soviet idiom. Prerequisite: Slav 4 or 6, or equivalent. (Academic year—day)

109–10 **Advanced Russian Conversation and Composition** (3–3) Moser

Developing proficiency in oral and written expression. Prerequisite: Slav 10 or equivalent. (Academic year—evening)

125 **Russian Linguistic Structure** (3) Thompson

Linguistic description of Russian phonology and morphophonemics. (Fall—day)

126 **Contrastive Russian-English Analysis** (3) Thompson

(Formerly Russian Linguistic Structure II)

Introduction to the basic principles and methods of contrastive linguistics and their application to the analysis of Russian and English phonology, morphosyntax, and lexicon. Theory and practice. (Spring—day)

128 **Dostoevsky, the Man and the Artist** (3) Natov-Popluiko

Sources and development of Dostoevsky's philosophical, religious, and aesthetic ideas. His influence on Russian and Western literature. Lectures, discussions, and reports—in English. (Fall—evening)

131 **18th Century Russian Literature** (3) Moser

Survey course in the history of Russian literature from 1700 to approximately 1820. Discussion of the rise of poetry, classicism, sentimentalism; the beginnings of prose. Course conducted in English; a reading knowledge of Russian required. (1972–73 and alternate years: fall—evening)

141–42 **19th Century Russian Literature** (3–3) Staff

Major Russian writers and literary trends from end of the 18th century to Chekhov: fiction, poetry, drama. Lectures, individual reports on assigned topics, and class analysis of selected works—in Russian. Prerequisite: Slav 4 or 6, or equivalent. (1972–73 and alternate years: academic year—day)

143–44 **The Russian Novel** (3–3) Moser

Genesis and development of the Russian novel. Evolution of form and techniques. Analysis of style, philosophy, and political ideology of representative novels of the 19th and 20th centuries—in English. (1971–72 and alternate years: academic year—day)

145 **The Russian Short Story of the 19th Century** (3) Natov-Popluiko

Study of historical development of the short story in 19th century Russia. Lectures, reports, and class analysis—in Russian. Prerequisite: Slav 4 or 6, or equivalent. (1971–72 and alternate years: fall—evening)

146 **The Russian Short Story of the 20th Century** (3) Natov-Popluiko

Study of the historical development of the short story in 20th century Russia. Lectures, reports, and class analysis—in Russian. Prerequisite: Slav 4 or 6, or equivalent. (1972–73 and alternate years: fall—evening)

151 **20th Century Prerevolutionary Russian Literature** (3) Natov-Popluiko

(This course, together with Slav 152, replaces former 151–52 20th Century Russian Literature (3–3))

Emphasis on symbolism and acmeism. Class analysis of selected texts. Recitations and reports—in Russian. Prerequisite: Slav 4 or 6, or equivalent. (1971–72 and alternate years: spring—day)

152 **Contemporary Russian Literature** (3) Natov-Popluiko

(This course, together with Slav 151, replaces former 151–52 20th Century Russian Literature (3–3))

Russian literature from 1917 to the present; emphasis on poetry and drama. Analysis of selected texts, reports—in Russian. Prerequisite: Slav 4 or 6, or equivalent. (1971–72 and alternate years: spring—day)

153 **Turgenev** (3) Moser

Reading and discussion of Turgenev's works. Emphasis on the novels; major short stories analyzed and some time spent on his plays and other prose works—in English. (1972–73 and alternate years: fall—day)

154 **Gogol** (3) Moser

Reading and discussion of Gogol's major works. Analytical study of short stories and plays in English. (1972–73 and alternate years: spring—day)

156 **Leo Tolstoy, His Life and Works** (3) Natov-Popluiko

Evolution of Tolstoy's artistic and philosophical ideas. Tolstoy's impact on Russian literature and society. Lectures, reports, and classroom analysis of his major works—in English. (Spring—evening)

161–62 **Russian Culture** (3–3) Olkhovsky

Survey of Russian cultural heritage from origins of ancient Russia to present—in English. Lecture, recitation, discussion, and individual reports on assigned topics. (Academic year—day)

165 **Soviet Literature from the Revolution to World War II** (3) Kandel

Basic themes, issues, literary figures of the Soviet 1920's. The fate of literature and writers under increasing state control; Five-year Plan literature. Lecture, discussion, reports—in English. (Fall—evening)

166 **Soviet Literature from World War II to the Present** (3) Kandel

Literature in wartime, under Stalinism, and in the "thaws." The new generation of dissident liberals and "underground" literature. Lecture, discussion, reports—in English. (Spring—evening)

193–94 **Introduction to Slavic (non-Russian) Literature—in English** (3–3) Kandel

An examination of non-Russian Slavic literatures from their beginnings to the present day. Emphasis on themes, ideas, and styles peculiar to each literature. The impact of national events and culture on each. (Academic year—evening)

197 **Special Problems in Teaching Russian** (3) Yakobson

Discussion of methodology, examination of textbooks, observation of classroom procedures. Prerequisite: 18 semester hours of Russian language. (1972–73 and alternate years: fall—evening)

199–200 **Proseminar: Readings for the Major in Russian Language and Literature** (3–3) Staff

Conferences and group discussions. (Academic year)

THIRD GROUP

215 **History of the Russian Language (3)** Thompson

(This course, together with Slav 216, replaces former 215–16 History of the Russian Literary Language (3–3))

Historical phonology and morphology of the Russian language. (1971–72 and alternate years: fall—evening)

216 **Comparative Slavic Phonology and Morphology** (3) Thompson

(This course, together with Slav 215, replaces former 215–16 History of the Russian Literary Language (3–3))

Study of the phonology and morphology of Russian as compared with other Slavic languages. Knowledge of a Slavic language other than Russian is helpful, but not required. (1971–72 and alternate years: spring—evening)

225 **Pushkin and the Poets of His Time** (3) Natov-Popluiko

Pushkin's predecessors; Pushkin's lyrics and dramas. Lermontov—the heir to Pushkin's poetic tradition. (1971–72 and alternate years: fall—evening)

253 **Seminar: Literary Criticism** (3) Natov-Popluiko

Study of leading Russian critics and their role in the development of Russian literature; the emergence of various literary schools. (1971–72 and alternate years: spring—evening)

254 **Seminar: Literary and Intellectual Currents of the 1860's** (3) Moser

Discussion of literary and intellectual developments in the Russia of the 1860's. Major figures treated in relation to the milieu of their times. Course conducted in English; a reading knowledge of Russian required. (1972–73 and alternate years: spring—evening)

255 **Seminar: Main Trends in 20th Century Russian Literature** (3) — Natov-Popluiko

Study of representative works since 1900; their artistic and social value—in Russian. (1972–73 and alternate years: fall—evening)

256 **Seminar: Stylistics in Russian** (3) — Natov-Popluiko

Study of the development of the Russian language, literary styles, and techniques: words and their aesthetic and political value, phraseological units, word order, and phrase structure. Comparative analysis of literary and nonliterary texts. (1972–73 and alternate years: spring—evening)

299–300 **Thesis Research** (3–3)

(Fall and spring)

Sociology

Professors R.W. Stephens, I.H. Cisin, H.J. Parry *(Research)*, R.G. Brown *(Chairman)*
Professorial Lecturers E.E. Jacobson, P.J. Palmer
Associate Professor T.F. Courtless, Jr.
Associate Professorial Lecturer S.H. Turner
Assistant Professors C.S. Harris, Patricia Lengermann, Phyllis Stewart, J.L. Tropea, Pamela Roby, Ruth Wallace, H.J. Becker *(Visiting)*
Assistant Professorial Lecturers W.R. Throckmorton, Charlotte Anker
Lecturer J.D. Spevacek

Bachelor of Arts with a major in Sociology (Departmental).—Prerequisite: the Arts and Letters curriculum, page 76, including Soc 1, 61; and Stat 53 or 104.

Required: in addition to the general requirements, pages 81–85, 24 semester hours in Sociology, which must include 141 and 149.

Master of Arts in the field of Sociology.—Prerequisite: a Bachelor's degree with a major in Sociology or in an approved related field. Applicants should present scores on the Graduate Record Examination, preferably including the Advanced Test in Sociology, and arrange for former professors to write letters of reference to the Graduate School of Arts and Sciences.

Required: the general requirements, pages 90–96. The minimum requirement consists of 24 semester hours of approved course work plus a thesis (equivalent to 6 semester hours). With the approval of the Department, a student may elect a program of study consisting of 36 semester hours of approved course work without a thesis. All degree candidates must include in their program of study Soc 230, 231, 238, 239, and Stat 105; and the satisfactory completion of a Master's Comprehensive Examination in three fields, including Sociological Theory, Sociological Research Methods, and one selected from Deviance, Political Sociology, Sociology of Work, Urban Sociology. All course work must be approved in advance by the adviser. Candidates must also fulfill the tool requirement by passing a reading knowledge examination in one foreign language or by satisfactorily completing the tool requirement in either Statistics or computer programming.

Doctor of Philosophy in the field of Sociology.—Required: the general requirements pages 90–94, 96–98. Students must pass the General Examination in four fields, including Sociological Theory, Sociological Research and Methods, and two selected from Deviance, Political Sociology, Sociology of Work, Urban Sociology.

Departmental prerequisite: Soc 1 and either 2 or 61 are prerequisite to all second- and third-group courses in Sociology.

FIRST GROUP

1–2 Introductory Sociology (3–3)

Soc 1: general principles of sociology; development of culture and personality, impact of groups and institutions on man's social behavior. Survey of fields within sociology. Soc 2: analysis of major social problems confronting the United States; factors producing social problems, their nature and treatment. (Soc 1: fall—day and evening; spring—day. Soc 2: fall—day; spring—day and evening.)

61 Development of Social Thought (3)

Examination of concepts and theories relevant to the nature of society and human relationships from ancient writings to the 20th century. Prerequisite: Soc 1. (Fall and spring—day)

SECOND GROUP

110 The Sociology of Work (3) Brown

Introductory survey of industrial sociology: sociology of occupations and professions; industry-community relations; and analysis of large, complex organizations. (Spring—day)

124 Medical Sociology (3) Brown, Stewart

Social factors and processes related to the etiology and treatment of physical and mental illness; medical occupations and professions and their patterned social relationships within medical organizations, principally hospitals; problems of delivery of health care services. (Fall—day)

125 Sociology of Religion (3) Wallace, Yeido

Introduction to history of the discipline; analysis of reciprocal impact of secular upon religious and religious upon secular institutions. (Fall—day)

126 Urban Sociology (3) Stephens

Place of the city in larger society; growth of the city, problems of urban living, group life, personality, urban housing, city planning, and suburban development. (Spring—day and evening)

127 Population Problems (3) Stephens, Stewart

Composition of populations, trends in population growth and population pressure, factors producing population movements, effects of migration, population policies—eugenics and birth control. (Fall—day)

128 Urban Problems and Policies (3) Roby

Seminar on urban problems and policies which have been developed in response to these problems; special focus on Washington, D.C.; students will be placed in Washington agencies, and seminar sessions will be devoted to a social-policy analysis of their experiences. (Spring—day)

129 Race and Minority Groups (3) Wallace

Analysis of relationships between dominant and minority groups in society, particularly in the United States; nature and range of problems; analysis of the phenomenon of prejudice. (Fall and spring—day)

130 **Social Stratification** (3) Roby, Stephens

Analysis of distribution of resources and opportunities for participation, education, and social mobility in American society; comparison of distribution of resources in the United States with that in other nations; analysis of public policies which affect these distributions. (Spring—day)

132 **Political Sociology** (3) Lengermann

Analysis of theoretical and research problems involved in the study of power relations in society—concepts of power, influence, authority; the distribution of power in society; types and processes of government; political participation and political mobilization. (Fall—day)

133 **Sociology of Education** (3) Roby, Stephens, Tropea

Analysis of educational systems from an institutional and organizational perspective and as agencies of socialization; relationships of education in general to society, including technological, communal, and subcultural components. Student teams study educational problems, policies, and issues of their own choosing. (Fall—day)

134 **Marriage and the Family** (3) Stephens

Courtship as a social process, marriage and marital adjustment, development of the family, parent-child relations, family problems, disorganization, divorce, and family reorganization. (Spring—evening)

135 **Juvenile Delinquency** (3) Courtless, Tropea, Turner

Factors producing delinquency, juvenile detention, the juvenile court, training schools, treatment of offenders. (Spring—day)

136 **Criminology** (3) Tropea, Courtless

Nature and distribution of crime as related to the development and operation of criminal law and various social and legal institutions in urban society. (Fall—day)

137 **Sociology of Law** (3) Courtless

Law as a social phenomenon and agency of social control. Problems of legal concepts, doctrines, and institutions. Prerequisite: Soc 136. (Spring—day)

139 **Society and the Deviant** (3) Tropea, Turner

Analysis of relationships of society, socialization, and deviancy. Social responses to deviancy and criminal offenders; rehabilitative programs in community, courts, and schools. (Fall—day)

141 **Social Research Methods** (3) Cisin, Stewart

Introduction to scientific method in the development of social theory and the solution to social problems. Prerequisite: Stat 53 or 104. (Fall and spring—day)

143 **Social Movements** (3) Harris

General survey of the various forms of collective behavior (fads, panics, riots, social movements, etc.), and a more detailed study of the genesis, development, and decay of social movements and social revolutions. (Spring—day)

144 **Public Opinion and Mass Communication** (3) Parry

Communication process with emphasis on international communications, propaganda, and mass media; measurement of propaganda campaigns. (Fall—day)

147 **Organizational Theory and Behavior** (3) Stewart

Introductory survey of traditional, contemporary theories and research describing behavior in large, complex organizations and their impact on American social life. (Fall—day)

149 **Modern Sociological Theory** (3) Wallace

Systematic study of contemporary schools of sociological theory, both European and American development; evaluation of scientific contributions of each school. Prerequisite: Soc 61. (Fall and spring—day)

191 **Current Emphases in Sociology** (3) Staff

Analysis and evaluation of recent developments in the general field of sociology and a review and discussion of basic concepts. Recommended for all senior sociology majors who plan to undertake graduate study in sociology. (Spring—day)

THIRD GROUP

210 **Theoretical Foundations of Political Sociology** (3) Lengermann, Roby

(Formerly Seminar: Political Sociology)

A review of the theoretical literature relevant to the sociological study of political processes; emphasis on concepts of power and authority, leadership, alienation, ideology, political socialization, and political change. (Fall—evening)

211 **Seminar: Social Change** (3) Lengermann

A macro-social, comparative, and interdisciplinary analysis of the processes of social change leading to and resulting from urbanization, including changes in motivation, values, and political, economic, and communication systems; the implication of such changes for other areas of institutionalized behavior. (Fall—evening)

212 **Seminar: Political Processes** (3) Lengermann, Roby

Sociological studies of the political process: distribution of power in community and society, types and processes of government, policy formation, political socialization, political participation, and political mobilization. Prerequisite: Soc 210. (Spring—evening)

220 **Religious Institutions in the United States** (3) Palmer, Yeide

Structural variety of religious institutions and patterns of interaction between religious and secular institutions in contemporary American life. (Spring—evening)

227 **Seminar: Sociology of Poverty** (3) Jacobson

Problems of definition and analysis with emphasis on emerging concepts and hypotheses; attention to methodological and research questions; implications for public policy and programming; field experience. (Fall—evening)

228 **Seminar: Urban Social Problems** (3) Jacobson

Detailed examination of the relationship between various institutions and problems of the city and urban society. Focus on different institutions or problems in different semesters. (Spring—evening)

230 **Social Research Methods** (3) Cisin, Stewart

(Replaces former Soc 142 Advanced Social Research Methods)

Translation of concepts into indices; analysis and interpretation of research results, measurement, scales and scoring, hypothesis testing. Prerequisite: Soc 141 or equivalent. (Fall and spring—day)

231 **Advanced Social Research Methods** (3) Cisin, Stewart

Intensive study and evaluation of current trends in the methodology of social research. Discussion on individual student projects and recently published research. Prerequisite: Soc 230. (Spring—evening)

233–34 **Seminar: Theory Construction and Application** (3–3) Wallace

Critical examination of the elements of current theories in the social sciences with the major objective of developing general principles of theory construction; consideration of the functions of theory in sociological research. (1972-73 and alternate years—academic year)

235 **Seminar: General Systems Theory** (3) Tropea

Review of the literature associated with general systems theory and its relation to theory construction and research in the social sciences. Systematic inquiry into the implications of a behavioral/systems approach to the analysis and management of societal problems, particularly urban problems. Interdisciplinary focus. (Spring—evening)

238 **Seminar: Development of Sociological Theory** (3) Lengermann

Intensive analysis of concepts and theories relevant to the nature of society and human relationships from ancient writings to the 20th century. (Fall—day)

239 **Seminar: Modern Sociological Theory** (3) Wallace

Intensive examination and evaluation of contemporary schools of sociological theory in Europe and America. An advanced analysis of theoretical perspectives. Prerequisite: Soc 238. (Spring—evening)

240 **Sociology of Occupations** (3) Brown, Harris

Analysis of occupational roles and structures and changes within them; recruitment and training; adjustment problems at various stages of the career; interrelationships of stratification systems, life styles, and occupations. (Fall—evening)

242 **Seminar: Problems in Medical Sociology** (3) Brown

(Formerly Sociology of Health and Illness)

Sociological analysis of various problems in the institution of medicine, e.g., delivery of health care services, interprofessional relationships, community mental health, etc. (Spring—day)

243 **Seminar: Industrial Sociology** (3) Harris, Stewart

Analysis of problems of the organization of work in industry, government, business; problems of decision-making, recruitment, allocation of authority, informal organization, and inter-organizational relations. (Fall—evening)

244 **Seminar: American Class Structure** (3) Roby, Stephens

Analysis of the class structure of American society in continuity and change. Critical review of theories of class, of the methodology of class, and of research reporting social and psychological correlates of class. (Fall—evening)

248 **Seminar: Organizational Theory and Behavior** (3) Harris, Stewart

Advanced analysis of theory and behavior in complex organizations relative to defining organizations, examining basic social processes and their relationship to the cultural environment. (Spring—day)

*259 **Law and Criminology I: Search for the Causes of Criminal Behavior** (3) Courtless

Role which criminological knowledge of crime causation may play in assisting lawyers to appraise the effectiveness of various alternative social and legal devices in controlling deviant behavior. The search for factors related to criminal behavior will be developed historically, with emphasis on current causal theories developed by various disciplines. Model as well as operational penal codes, sentencing and probation practices, and specialized facilities will be analyzed in terms of their relationship to such causal theories.

†261 **Law and Criminology II: Society's Responses to the Criminal Offender** (3) Courtless

Study of the development and current use of society's three major approaches to the handling of offenders: punitive, mechanical, and correctional. Emphasis on society's changing responses to criminal and delinquent behavior, and research findings concerning effectiveness of these responses. Analysis of treatment strategies to facilitate communication between members of the legal profession and behavior scientists charged with effectuating these strategies.

‡262 **The Police and the Community** (3) Allen, Courtless

Problems and potential of contemporary urban law enforcement: the role and perspective of the police officer; the police *qua* organization; "styles" of law enforcement; law enforcement in the inner city; relationship with ethnic minorities; civil disorder; police-community relations; methods in arrest and investigation; complaint review procedures; science and technology in law enforcement; police handling of juveniles; crime and crime statistics. (Spring—day)

263 **Seminar: Law and Society** (3) Courtless

Selected problems in law as an instrument of social policy; emphasis on the organization of legal decision-making processes. (1972-73 and alternate years: spring)

295 **Research** (arr.) Staff

May be repeated once for credit. (Fall and spring)

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* Same as Law 475 (2). Graduate students registering for Soc 259 make special arrangements with the instructor for supplementary assignments equivalent to one additional semester hour.
† Same as Law 476 (2). Graduate students registering for Soc 261 make special arrangements with the instructor for supplementary assignments equivalent to one additional semester hour.
‡ Same as Law 477 (2). Graduate students registering for Soc 262 make special arrangements with the instructor for supplementary assignments equivalent to one additional semester hour. Mr. Allen is Professor of Law in the National Law Center.

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Spanish

See "Romance Languages and Literatures."

Special Education

Professor Perry Botwin *(Chairman)*
Associate Professors Bertice Cornish, R.S. Cottrell, Jr.
Assistant Professors M.G. Van Dyke, R.W. Prouty, Rita Ives

Programs of study in Special Education leading to the degrees of *Bachelor of Arts in Education, Master of Arts in Education, Education Specialist,* and *Doctor of Education* are offered by the School of Education (see pages 101–25).

SECOND GROUP

101 **Seminar: an Overview of Special Education** (3) Ives
Interrelated seminar with presentations by the entire staff. Overview of historical development, existing models, and future trends. Local leadership personnel in special education will participate. (Fall—evening)

102 **Teaching the Child with Special Needs: Techniques and Methods** (3) Ives
(Formerly Basic Specialized Teaching Techniques and Materials I)
Laboratory course taught in an elementary public school. Students observe and participate in a demonstration seminar conducted by the instructor. Techniques and methods emphasized in their relation to the specific child population of the seminar. Must be taken concurrently with S Ed 189. Admission by permission of instructor. (Fall—day)

103 **Teaching the Child with Special Needs: Creative Programming** (3) Ives
(Formerly Basic Specialized Teaching Techniques and Materials II)
Continuation of S Ed 102. Concentration on the total programming of the child with special needs. Must be taken concurrently with S Ed 190. Prerequisite: S Ed 102. (Spring—day)

170 **Interpersonal/Intrapersonal Relationships for Teachers** (3) — Prouty, Van Dyke

Consideration of factors leading to successful interaction with children. (Fall—day)

189 **Preprofessional Internship in Special Education I** (3) — Ives

Supervised internship in school setting. Emphasis on intensive study of a child with educational difficulties. Must be taken concurrently with S Ed 102. (Fall)

190 **Preprofessional Internship in Special Education II** (3) — Ives

Observation and participation in various special education settings. Emphasis on exposure to and familiarity with goals and programs of various special education models. Must be taken concurrently with S Ed 103. (Spring)

200 **Understanding Young Children** (3) — Staff

Lecture and field experience. Basic concepts of early child development as applied to special education. Admission by permission of instructor. (Fall—day)

THIRD GROUP

201 **Introduction to Special Education** (3) — Botwin

Survey course to acquaint prospective teachers with special education and to help them become aware of the various educational modifications necessary to accommodate children in a school program. (Fall—evening)

204 **Problems in Urban Education** (3) — Prouty

Problems and issues in urban education; emphasis on factors affecting successful educational practice in low-income areas. Admission by permission of instructor. (Fall—day)

240 **Educational Programming for Children with Behavioral Problems** (3) — Van Dyke

Analysis of educational provisions for children with behavioral problems through study of ecological considerations in the light of contemporary special education theory. Admission by permission of instructor. (Fall—day)

241 **Preprofessional Internship: Children with Behavioral Problems** (6) — Van Dyke and Staff

Practicum experience early in the training sequence, consisting of observation of, and interaction with, children with behavioral problems under the direction of qualified teachers in a field setting and the supervision of the University staff. Admission by permission of instructor. (Fall)

242 **Clinical Teaching of Children with Behavioral Problems** (3) — Staff

Lectures and discussions exploring various psychoeducational techniques of teaching children and adolescents with behavioral problems, interpersonal interaction between teachers and disturbed children, use of group factors in the teaching-learning process, and selection of appropriate teaching methods and materials. Admission by permission of instructor. (Fall—day)

250 **Specialized Techniques and Materials for Diagnostic-Prescriptive Teachers** (3) Staff

(Formerly Advanced Specialized Teaching Techniques and Materials)

Selected materials and techniques used in diagnostic-prescriptive teaching. Must be taken concurrently with S Ed 252. Admission by permission of instructor. (Fall—day)

251 **Psychosocial Factors in Diagnostic-Prescriptive Teaching** (3) Prouty

(Formerly Psychosocial Considerations in Special Education)

Psychosocial factors significant in the process of diagnostic-prescriptive teaching. Admission by permission of instructor. (Fall—day)

252 **Professional Internship for Diagnostic-Prescriptive Teachers** (3) Staff

(Formerly Professional Internship: Special Education)

Supervised school experience in diagnostic-prescriptive teaching. Must be taken concurrently with S Ed 250. Admission by permission of instructor. (Fall)

253 **The Humanizing Curriculum and Diagnostic-Prescriptive Teaching** (3) Staff

Curriculum concepts and modifications aimed at enhancing the classroom environment for learning and growth. Admission by permission of instructor. (Fall and spring—day)

*260 **Diagnosis of the Educational Needs of Younger Children** (3) Cornish

Lecture-demonstration course designed to explore the existing and experimental diagnostic tools to aid in education planning for young children. Admission by permission of instructor. (Fall)

*261 **Special Methods for Teaching Young Children** (3) Staff

Study and laboratory practice in specialized techniques and materials for young children. Students develop and experiment with new methods and materials. Admission by permission of instructor. (Fall)

262 **Seminar: the Education of Young Exceptional Children** (3) Cornish

Weekly seminar dealing with concepts and topics pertinent to the education of young exceptional children. Admission by permission of instructor. (Spring)

263 **Introduction to the Education of the Severely and Multiply Handicapped** (3) Staff

(Formerly Special Teaching of Severely- and Multiply-handicapped Children)

Survey of the characteristics and learning patterns of children with severe disabilities. Lecture and field experience. (Fall—day)

264 **Advanced Study in the Special Education of the Severely and Multiply Handicapped** (3) Staff

Specialized programs, techniques, and methods for teaching children with severe disabilities. (Spring—day)

* Classes held at Georgetown University

265 **Utilization of Supportive Personnel in Early Educational Programs for Exceptional Children** (3) — Staff

Methods and opportunities for the use of para-professionals, volunteers, and parents in the education of young children with special needs. (Spring—day)

*269 **Clinical Teaching in Early Childhood Education** (3) — Cornish

Supervised clinical internship in special education with young children. Admission by permission of instructor. (Fall)

290 **Practicum in Teaching in Special Education** (6) — Ives

Supervised student teaching of children identified as needing special education services. Minimum of 210 clock hours required. Admission by permission of instructor. (Spring)

291 **Practicum in Teaching Children with Behavioral Problems** (9) — Van Dyke and Staff

Supervised student teaching in programs for children with behavioral problems under the direction of a qualified teacher and the supervision of the University staff. Minimum of 420 clock hours required. Admission by permission of instructor. (Spring)

292 **Practicum in Teaching Young Children in Special Education** (3)

Supervised student teaching in special education in classrooms for young children. Minimum of 210 clock hours required. (Spring)

294 **Practicum in Diagnostic-Prescriptive Teaching** (9) — Prouty and Staff

Supervised field experience in diagnostic-prescriptive teacher programs. Minimum of 350 clock hours required. Admission by permission of instructor. (Spring)

297–98 **Individual Study in Special Education** (3–3) — Staff

Individual study or research under guidance of staff member. Program and conferences arranged with adviser. Admission by permission of adviser. (Academic year)

303 **Administration and Supervision of Special Education** (3) — Botwin

Philosophy and nature of special education; program organization, administration, and development. Surveying local-level needs; program evaluation and supervision. Admission by permission of instructor. (Spring—evening)

304 **Recent Research and Trends in Special Education** (3) — Cottrell

Emphasis on research methodology and considerations. The unique problems of doing research in special education. Procedures and sources for obtaining research funding. Admission by permission of instructor. (Fall—evening)

306 **Guidance and Counseling Families of Children with Special Needs** (3) — Cornish

Working with parents and community agencies in meeting the educational and social needs of young children. Admission by permission of instructor. (Spring—day)

*Classes held at Georgetown University.

308 **Instructional Media, Technology, and Education** (3) Cottrell

Review and consideration of technological developments as they affect education and special education, including historical perspective; operating principles of various kinds of hardware, including printing, audio-visual equipment, television, and computers. Status of software for use with hardware. Admission by permission of instructor. (Spring—evening)

342 **Seminar: Crisis/Resource Teaching** (3) Van Dyke

Topics and concepts relevant to an exploration of alternative models in the education of children perceived as having learning/behavior problems. Admission by permission of instructor. (Spring—day)

343 **Psychoeducational Diagnosis of Children with Behavior or Learning Difficulties** (3) Van Dyke

Lecture and laboratory course designed to develop *educational* strategies for children who present behavior or learning problems in the schools. Admission by permission of instructor. (Fall—day)

345 **Public School Consultation and Program Planning for Children with Behavioral Problems** (3) Van Dyke

Exploration of mental health consultation models in public schools, in-service training programs for educational personnel, and special programming for behaviorally disordered children in the schools. Extensive field work experience in conjunction with the lecture/discussion format. Admission by permission of instructor. (Spring)

350 **The Diagnostic-Prescriptive Teacher** (3) Prouty

Rationale, operational models, techniques, and problems relevant to implementation of diagnostic-prescriptive teacher programs. Admission by permission of instructor. (Fall—day)

351 **Seminar for Diagnostic-Prescriptive Teachers** (3) Prouty and Staff

Current practices in regular and special education as they affect the diagnostic-prescriptive teacher; emphasis on concurrent field experience. Admission by permission of instructor. (Spring—day)

370 **Intrapersonal Dynamics in Special Education** (3) Prouty, Van Dyke

Small group exploration of intrapersonal factors essential to understanding roles and interpersonal techniques in teaching exceptional children. Admission by permission of instructor. (Spring—day)

FOURTH GROUP

453–54 **Doctoral Internship: Special Education** (3–3) Staff

Supervised professional internship in college teaching, administration, supervision, or private agency function. Each internship individually arranged. Admission by permission of adviser. (Academic year)

490 **Doctoral Seminar: Special Education** (3) Staff

Interrelated seminar for advanced doctoral students. Consideration of major issues of philosophy, policy, and practice in special education. Admission by permission of adviser. (Spring)

491 **Dissertation Research** (arr.) Staff

(Fall and spring)

Speech and Drama

Professors G.F. Henigan *(Chairman) (Director of Forensics)*, E.L. Stevens
Professorial Lecturer Gilbert Herer
Associate Professors Lee Bielski, J.W. Hillis *(Director of Speech Pathology and Audiology)*, L.S. Bowling, Sr., W.M. Reynolds, S.G. James *(Director of Theater)*
Assistant Professors Joan Regnell, J.P. Fox, Diane Brewer, N.C. Garner
Assistant Professorial Lecturer Leonard Biegel
Instructors Dean Munroe, M.W. Naylor
Lecturers Lois Tucker, Jacqueline Dudley, M.L. Thompson

Bachelor of Arts with a major in Dramatic Art (Departmental).—Prerequisite: the Arts and Letters curriculum, page 76, including Sp&D 1, 11, and 32.

Required: the general requirements, see pages 81–85, including Sp&D 115, 151, 161–62, 165–66; and a minimum of 6 additional hours in theater arts and dramatic literature as approved by the adviser. Students must meet the Speech Proficiency requirement established by the Department.

Bachelor of Arts with a major in Speech Communication (Departmental).—Prerequisite: the Arts and Letters curriculum, page 76, including Sp&D 1 and 11.

Required: the general requirements, see pages 81–85, including Sp&D 112, 121, 126, 143–44; and a minimum of 9 additional hours in second-group courses in speech communication and related courses, as approved by the adviser. Students must meet the Speech Proficiency requirement established by the Department.

Bachelor of Arts with a major in Speech Pathology and Audiology (Departmental).—Prerequisite: the Arts and Letters curriculum, page 76, including Sp&D 1 and 11.

Required: the general requirements, see pages 81–85, including Sp&D 101, 171; and a minimum of 18 additional hours in second-group courses in speech pathology and audiology, as approved by the adviser. Students must meet the Speech Proficiency requirement established by the Department.

Master of Arts in the field of Speech Pathology and Audiology.—Prerequisite: the degree of Bachelor of Arts with a major in Speech Pathology and Audiology from this University, or an equivalent degree, and the score on the Aptitude Test of the Graduate Record Examination.

Required: the general requirements, pages 90–96. The program of study consists of 24 semester hours of approved course work plus a thesis (equivalent to 6 semester hours), or with the approval of the Department, 36 semester hours of course work without a thesis. All students must satisfy the academic and supervised practicum requirements for the Certificate of Clinical Competence awarded by the American Speech and Hearing Association, and they must include Sp&D 275 in their program of study.

Master of Fine Arts in the field of Dramatic Art.—Prerequisite: the degree of Bachelor of Arts from this University, or an equivalent degree.

Required: the general requirements, pages 90–96. The program of study consists of 24 semester hours of second- and third-group course work in drama and dramatic literature plus the production and direction of a major three-act play, equivalent to 6 additional semester hours.

Bachelor of Arts in Education with a teaching field in Speech and Drama.—Prerequisite: the Education curriculum, pages 78–79.

Required: the Speech and Drama option and the professional courses listed on pages 114–15.

Speech and Hearing Therapy: See Speech and Hearing Clinic, pages 53–54.

Clinical Certification: The Department of Speech and Drama offers preparation for certificates of clinical competence, issued by the American Speech and Hearing

Association, in speech pathology and/or audiology. For details consult the Department.

FIRST GROUP

A American Speech for Foreign Students (3)

Class limited to foreign-born students. Instruction in the formation of the sounds of spoken English, with emphasis on rhythm and inflection. International Phonetic Alphabet used. Recording fee, $5. (Fall and spring—day)

1 Communicative Speaking and Listening (3) Henigan and Staff

Basic theories and principles of speech communication: composition, delivery, and criticism of speaking in interpersonal, group, and public situations. Recording fee, $2. (Fall and spring—day and evening)

11 Voice and Diction (3) Bielski and Staff

Development of naturalness, correctness, and clarity in conversational speech. Analysis and correction of individual speech delivery faults through tapes and weekly performances. Class instruction on concepts of acceptable voice and diction standards. Recording fee, $4. (Fall and spring—day and evening)

32 Oral Interpretation of Literature (3) Garner, Munroe

Theory and practice in discovering and communicating orally the meaning in literature through analysis of form and content. Techniques of reading prose, poetry, and drama for listeners. Prerequisite: Sp&D 11. Recording fee, $2. (Fall and spring—day)

45 Understanding the Theater (3) James

(Formerly Introduction to the Theater)

The art of the theater; its literature, aesthetics, and mechanics. Contemporary drama and film art. Contributions of the playwright, actor, director, and designer examined through lectures, visiting artists, class discussions, and attendance at theatrical performances. Primarily for nonmajors. (Spring—day)

49 Social Dynamics of Speech Communication (3) Reynolds

A survey of speech communication techniques and rhetorical principles underlying social protest speaking; emphasis on public address of Black Power, the New Left, and the peace movement. (Fall—evening)

SECOND GROUP

101 Phonetics (3) Brewer

Acoustics of speech production and perception; phonetics and phonemic transcription systems; their application in linguistic analysis with emphasis on disorders of speech and hearing. Laboratory fee, $17.50. (Spring—day)

111 Business and Professional Speaking (3) Stevens

Study of the communication process in business and professional speaking; practice in presenting technical reports; selling policies, programs, and services; interviews; conferences; speech in training and supervisory activities. Primarily for nonmajors. (Fall—day)

112 **Advanced Public Speaking** (3) Reynolds

In-depth study of and practice in the principles and techniques of persuasive speaking, with emphasis on the psychological factors in audience analysis and adaptation. Prerequisite: Sp&D 1 or permission of instructor. (Spring—day)

115–16 **Acting** (3–3) James

(Replaces former Sp&D 115 Acting (3) and Sp&D 116 Advanced Acting (3))

Study and practice of fundamentals of acting technique: sense memory, improvisation, character analysis, role development. Prerequisite: Sp&D 32. (Academic year—day)

121 **Group Discussion and Conference Leadership** (3) Stevens

Process of thinking and problem-solving in committees and small groups; methods of leading discussions and conferences. Prerequisite: Sp&D 1 or permission of instructor. (Fall and spring—day)

123 **Training the Student Advocate: Special Events** (2)

Intensive study in the techniques and methods of preparing students for responsible speaking in public or contests. Workshop emphasizes the logical, motivational, and ethical demands of oratory, extempore speaking, interpretative speaking, and student congress.

124 **Training the Student Advocate: Debate** (3)

In-depth investigation into the theory and methods of teaching high school debate with special attention to preparing students for competition.

126 **Argumentation and Debate** (3) Reynolds

Study of the advocacy system; special emphasis on issue identification, use of evidence, and logical proof. Extensive practice in argumentative speaking. Prerequisite: Sp&D 1 or permission of instructor. (Spring—day)

127–28 **Advanced Debate Practice** (1–1) Naylor

Admission by permission of instructor, after one semester of satisfactory participation in intercollegiate debate program. May be repeated for a total of 4 semester hours. (Academic year)

133–34 **Radio and TV Broadcasting** (3–3) Biegel

Study of the development of radio and TV industries, station organization and management, equipment, production techniques; practice in preparation and performance of radio programs. Recording fee for Sp&D 134, $5. (Academic year—evening)

135–36 **Radio Workshop** (1–1)

Practical work in campus radio station. Admission by permission of instructor, after one semester of satisfactory participation in WRGW activities. May be repeated for a total of 4 semester hours of credit. (Academic year)

143 **History and Criticism of European Public Address** (3) Reynolds

Survey of speakers and rhetorical methods as they evolved in Western European democracies from the classical period to the present time. (Fall—day)

144 **History and Criticism of American Public Address** (3) Reynolds
Study of American oratory from its pre-Revolution origins to the present day, interpreted in terms of issues and movements. (Spring—day)

151 **Stagecraft** (3) Munroe
Lecture (2 hours), laboratory (1 hour). Theories and practicum in the technical aspects of production. (Fall—day)

152 **Advanced Stagecraft** (3) Munroe
Lecture (2 hours), laboratory (1 hour). Theories and practicum in stage lighting and contemporary devices and effects. Prerequisite: Sp&D 151 or permission of instructor. (Spring—day)

154 **Play Directing** (3) Garner
Fundamentals of play directing. Studies in dramatic composition, character analysis, casting, rehearsing, play analysis. Under supervision of instructor, students cast and prepare scenes for presentation. Prerequisite: Sp&D 115. Laboratory fee, $5. (Spring—day)

155–56 **Play Production Practice** (1–1) Staff
Practical work in theater: assigned production duties, special projects under instructor's supervision. May be repeated for a total of 4 semester hours of credit. Admission by permission of instructor. (Academic year)

161–62 **Theatrical Styles** (3–3) James
Historical and critical study of significant plays and production methods. Sp&D 161: to the Restoration. Sp&D 162: since the Restoration. (Academic year—evening)

165–66 **History of the Theater** (3–3) Garner
An examination of the development and growth of the theater from its beginnings to the present. Sp&D 165: Greek through Restoration. Sp&D 166: the 18th century to the present. (Academic year—evening)

169 **Introduction to Creative Dramatics** (3) James
Study of philosophies and practices underlying dramatics with children; materials and methods for conducting improvised dramatic activities in elementary and secondary education. Students lead classes of children. (Fall—day)

171 **Bases of Speech and Hearing** (3) Hillis
(Formerly Introduction to Speech Pathology and Audiology)
Structural and functional foundations of speech production and reception. (Spring—day)

172 **Speech Pathology I** (3) Regnell
Pathologies and therapeutic procedures in articulatory and voice disorders and cleft palate. Prerequisite: Sp&D 101, 171. (Fall—day)

173 **Speech Pathology II** (3) Fox
Pathologies and therapeutic procedures in stuttering and disorders of central or peripheral nervous systems. Prerequisite: Sp&D 101, 171. (Fall—day)

176 **Speech, Hearing, and Language Development** (3) Fox
Study of normal speech and auditory function from prenatal development through the emergence of language. (Spring—day)

182 **Introduction to Audiology** (3) Brewer

Overview of the field of audiology to include a review of sound and its properties, anatomy and physiology of auditory system, and methods and procedures of pure tone and speech audiometry, with emphasis on their application to the study of hearing disorders. Demonstration and practicum with the pure tone audiometer. Prerequisite: Sp&D 101, 171. (Fall—day)

183 **Clinical Procedures in Speech and Hearing** (3) Regnell

Method, theory, and practice in preparation of therapeutic objectives and materials; practice and observation in speech and hearing evaluation. Prerequisite: Sp&D 172 or 182. (Spring—day)

184 **Clinical Practice in Speech and Hearing** (arr.) Staff

Supervised case work in speech and hearing in the University Speech and Hearing Clinic and selected off-campus facilities. May be repeated for a total of 3 semester hours. Prerequisite or concurrent registration: Sp&D 183. (Fall and spring)

188 **Aural Rehabilitation** (3) Brewer

Systems, principles, and methods of auditory training and speech reading, including development of lesson plans and their application in resolving communication problems of acoustically-handicapped individuals. Prerequisite: Sp&D 182. Laboratory fee, $7.50. (Fall—day)

THIRD GROUP

215–16 **Advanced Acting** (3–3) James

Study of character analysis, transactional analysis, exercise principles, improvisation, and styles. (1972–73 and alternate years: academic year)

249–50 **Design** (3–3) Staff

Fundamental study of principles and concepts of theater design. (1972–73 and alternate years: academic year)

253–54 **Costuming** (3–3) Staff

Study of costume history, materials, and construction. (Academic year)

255 **Lighting** (3) Garner

Theory and practice of stage lighting. (Fall)

256 **Advanced Directing** (3) James

Play analysis, character analysis; directing of scenes and one-act plays under supervision. (Spring)

257 **Modern Trends** (3) James

Study of recent trends in theatrical criticism, theory, and play production. (1972–73 and alternate years)

258 **Theater Management** (3) Staff

Theory and practice in the psychology of handling the public: promotion, box office and house management. Admission by interview.

275 **Research Methods in Speech Pathology and Audiology** (3) Hillis

Clinical interpretation of research literature in speech pathology and audiology; application of research methodology in the management of speech, language, and hearing disorders. Provides information supplementary to the management of speech, hearing, and language disorders. (Fall—day)

277 **Advanced Clinical Procedures in Speech and Hearing** (arr.) Staff

(Fall and spring)

278 **Advanced Clinical Practice in Speech and Hearing** (arr.) Staff

(Fall and spring)

279 **Anatomy and Physiology of Speech and Hearing** (3) Bowling

Study of structures and pathologies of speech and hearing. Laboratory fee, $15. (Fall—evening)

280 **Neurological Speech and Language Disorders** (3) Fox

Evaluation and therapy for speech and language disorders resulting from neurological pathology: aphasia, apraxia, dysarthria, and related disorders. Laboratory fee, $7.50 (Fall—evening)

281 **Advanced Clinical Audiology** (3) Bowling

Principles and methods underlying assessment of auditory disorders; emphasis on bone conduction, masking, and speech intelligibility. Clinical implications, tests, demonstration, and practicum. Laboratory fee, $7.50. (Fall—day)

282 **Special Auditory Tests** (3) Bowling

Special speech and pure tone audiometric techniques for differentiating conductive, cochlear, and retro-cochlear lesions, for identifying functional hearing losses. Clinical application of tests and interpretation of results. Laboratory fee, $7.50. (Spring—evening)

283 **Community Programs in Speech and Hearing** (3) Herer

Methods and procedures for management of hearing and speech programs; review of hearing conservation and monitoring programs and operational aspects of clinical programs designed to meet the needs of individuals with communicative disorders. Provides information supplementary to the management of speech, hearing, and language disorders. Laboratory fee, $7.50. (Fall—evening)

284 **Disorders of Articulation** (3) Hillis

(Formerly Experimental Phonetics)

Consideration of pathologies and treatment of disorders of speech articulation; emphasis on current treatment procedures. Laboratory fee, $7.50. (Spring—day)

285 **Hearing Aids** (3) Brewer

Discussion of hearing-aid characteristics and electroacoustic measurements; hearing-aid effectiveness in improving communicative efficiency; procedures for selection and clinical evaluation of hearing aids; counseling of the patient. (Spring—day)

286 **Disorders of Voice and Resonance** (3) Hillis
(Formerly Evaluation of Speech and Language Disorders)
Consideration of pathologies and treatment of disorders of voice and resonance; emphasis on current treatment procedures. Laboratory fee, $5. (Fall—day)

288 **Psychosocial Aspects of Hearing Loss** (3) Bowling
(Formerly Aural Rehabilitation)
Consideration of the rationale and procedures for evaluating the social and emotional behavior as well as the intellectual potential of those with impaired hearing. Laboratory fee, $7.50. (Spring—day)

291 **Seminar: Speech Pathology** (3) Staff
Current topics in speech and language pathology. May be repeated for credit. (Spring—evening)

292 **Seminar: Audiology** (3) Staff
Offered in such areas as theories of audition, special auditory tests, aural rehabilitation, psychoacoustics. May be repeated for credit. (Spring—evening)

293 **Stuttering and Related Disorders** (3) Hillis
Consideration of pathologies and treatment of dysrhythmic speech function; emphasis on current treatment procedures.

294 **Independent Research in Dramatic Art** (arr.) Staff
May be repeated for credit. (Fall and spring)

295 **Independent Research in Speech and Hearing** (arr.) Staff
May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

Statistics

Professors E.H. Johnson *(Emeritus)*, H.F. Bright, Solomon Kullback *(Chairman)*, H.W. Lilliefors, A.D. Kirsch
Professorial Lecturers Samuel Greenhouse, Morton Kupperman, W.W. Wolman
Associate Professors R.H. Shumway, C.T. Ireland
Associate Professorial Lecturers Sidney Armore, Selig Starr, M.A. Schwartz, R.L. Beatty
Assistant Professors R.E. Thomas, C.R. Mann
Adjunct Assistant Professor J.K. Kern
Assistant Professorial Lecturer Fred Frishman
Lecturers Bert Levy, William Rutiser, T.C. Teeples, C.H. Allen

Bachelor of Arts or *Bachelor of Science with a major in Applied Statistics (Departmental).*—Prerequisite: the Arts and Letters or the Science curriculum, respectively, pages 76–77, including Math 31; Stat 91, 97.

Required: the general requirements, pages 81–85, including Math 32 and 34, or former 24; Stat 113, 117, 118, 155 or 159, 157–58, and 6 additional hours of second-group Statistics courses selected with the approval of the adviser; a minimum

of 24 semester hours including Math 124, and courses in other departments approved by the adviser as contributing to a well-organized program. For further details, consult the adviser.

Bachelor of Arts or *Bachelor of Science with a major in Mathematical Statistics (Departmental).*—Prerequisite: the Arts and Letters or the Science curriculum, respectively, pages 76–77, including Math 31, Stat 91.

Required: the general requirements, pages 81–85, including Math 32 and 34; or former 24; Stat 117, 118, 157–58, 189–90, and 6 additional hours of second-group Statistics courses selected with the approval of the adviser; a minimum of 24 semester hours, including Math 124, 139, 140, and 157 (Math 250 is recommended), and courses in other departments approved by the adviser as contributing to a well-organized program. For further details, consult the adviser.

Master of Science in the field of Applied Statistics or *Master of Arts in the field of Mathematical Statistics.*—The program of study consists of 36 semester hours of course work without a thesis. In exceptional cases the Department may approve a program of study consisting of 30 semester hours of course work plus a thesis, equivalent to 6 additional semester hours. Candidates must pass a written Master's Comprehensive Examination and must fulfill the tool requirement by passing either a reading knowledge examination in an acceptable foreign language or an examination in computer language. The successful completion of course work in computer programming does not obviate the requirement to pass a special examination should the computer option be elected as a tool. For prerequisites and additional requirements, see below.

Master of Science in the field of Applied Statistics.—Prerequistie: a Bachelor's degree with a major in Applied Statistics from this University, or an equivalent degree. If undergraduate study did not include equivalent required courses at this University, those courses must be taken as prerequisite to graduate study.

Required: the general requirements, pages 90–96, including 24 semester hours of Statistics and 12 additional hours of approved course work in an area of interest to the candidate. Courses are selected in consultation with the adviser.

Master of Arts in the field of Mathematical Statistics.—Prerequisite: a Bachelor's degree with a major in Mathematical Statistics from this University, or an equivalent degree. If undergraduate study did not include equivalent courses at this University, those courses must be taken as prerequisite to graduate study.

Required: the general requirements, pages 90–96, including Stat 201–2 or 257–58; and 217–18. The remaining 24 semester hours must be selected in consultation with the adviser.

Doctor of Philosophy in the field of Mathematical Statistics.—Prerequisite: the degree of Master of Arts in the field of Mathematical Statistics from this University, or an equivalent degree.

Required: the general requirements, pages 90–94, 96–98. A minimum of 24 semester hours of course work must be taken in residence at this University before the General Examination may be completed. The General Examination consists of an oral examination following four days of written examinations in Matrix Algebra, Real and Complex Analysis, Probability, and Mathematical Statistics. The first two parts of the General Examination may be taken after successful completion of Stat 259–60 or its equivalent; the third and fourth parts may be taken after completion of Stat 257–58, 263–64, 265–66, and a 3-semester-hour seminar. The tool requirement may be fulfilled by passing a reading knowledge examination in two foreign languages or by a combination of passing a reading knowledge examination in one foreign language and an examination in computer language. The successful completion of course work in computer programming does not obviate the requirement to pass a special examination should the computer option be elected as a tool.

Research Fields: Biometrics, Design of Experiments, Econometrics, Information Theory, Multivariate Analysis, Operations Analysis, Sampling, and Statistical Inference.

Departmental prerequisite: One entrance unit in algebra is prerequisite to all first-group courses in Statistics.

FIRST GROUP

49 **The Language of Statistics** (0) Kirsch

For doctoral students as a minimum option in lieu of a foreign language. No academic credit. Tution fee, $296.

*51 **Introduction to Business and Economic Statistics** (3) Staff

Lecture (3 hours), laboratory (1 hour). Frequency distributions, descriptive measures, probability, sampling, estimation, tests of hypotheses, correlation, time series, index numbers. Laboratory fee, $11. (Fall and spring—day and evening)

*52 **Mathematics of Finance** (3) Johnson

Interest and discount, annuities, valuation of stocks and bonds, sinking funds, amortization, valuation of depletable assets, depreciation. (Spring—day)

*53 **Introduction to Statistics in Psychology and Education** (3) Staff

Lecture (3 hours), laboratory (1 hour). Frequency distributions, descriptive measures, probability, sampling, estimation, tests of hypotheses, correlation, analysis of variance. Laboratory fee, $11. (Fall—day; spring—day and evening)

*91 **Principles of Statistical Methods** (3) Staff

Lecture (3 hours), laboratory (1 hour). Variables and attributes, averages and dispersion, frequency distributions and their characteristics, regression and correlation, statistical decision processes. Laboratory fee, $11. (Fall and spring)

97 **Introduction to Computer Programming** (3) Thomas and Staff

Lecture (2 hours), laboratory (2 hours). Computer and programming concepts. High-level language programs written by students will be run on the University computer. Laboratory fee, $22. (Fall and spring—day)

SECOND GROUP

†104 **Statistics in the Behavioral Sciences and Education I** (3) Staff

Lecture (3 hours), laboratory (1 hour). Introductory study of statistical techniques for research problems in behavioral sciences and education. Laboratory fee, $11. (Fall—evening)

105 **Statistics in the Behavioral Sciences and Education II** (3) Kirsch

Lecture (3 hours), laboratory (1 hour). Advanced study of statistical techniques for research problems. Analysis of variance, correlation techniques, chi-square applications, sampling theory. Prerequisite: Stat 53 or 104. Laboratory fee, $11. (Fall—evening)

* Stat 51, 53, and 91 are related in their subject matter, and credit hours for only one of the three may be applied toward a degree. Stat 52 lies outside of this group, and may be taken for degree credit in combination with any one of the other three.

† May not be taken for credit by students who have received credit for Stat 51, 53, or 91.

106 **Factor Analysis** (3) Kirsch

Concepts of factor analysis and their utility in various phases of research and related topics. Prerequisite: Stat 105 or equivalent. Laboratory fee, $11.

107 **Statistics for Engineers** (3) Staff

Probability models, discrete and continuous distributions, sampling, hypothesis testing and estimation, engineering applications. Prerequisite: differential and integral calculus.

109–10 **Quality Control and Reliability Techniques** (3–3)

Statistical methods and probability models for quality control and reliability applications. Prerequisite: Stat 91 or 107.

111 **Business and Economic Statistics I** (3) Johnson

Statistical processes as tools in decision-making in areas of economics and business. Prerequisite: Stat 51 or permission of instructor. (Fall—day and evening)

112 **Business and Economic Statistics II** (3) Johnson

Case work to illustrate quantitative procedures for solution of economic and business problems. Prerequisite: Stat 111 or equivalent. (Spring—day and evening)

113 **Computer Programming** (3) Thomas and Staff

Lecture (2 hours), laboratory (2 hours). Computer concepts beyond the introductory level; an introduction to assembly language and advanced high-level language programming. Prerequisite: Stat 97. Laboratory fee, $22. (Spring)

114 **Introduction to Computer Operating Systems** (3) Thomas and Staff

Design and implementation of operating systems, program editing and loading, supervisory routines, input-output control, multi-programming, scheduling systems, future trends. Prerequisite: Stat 113. Laboratory fee, $22. (Spring)

115 **Programming Languages** (3) Thomas and Staff

Concepts of programming languages, compiler techniques, nonnumeric programming. Prerequisite: Stat 113 or permission of instructor. Laboratory fee, $22. (Fall—evening)

117 **Analysis of Variance** (3) Staff

Lecture (3 hours), laboratory (1 hour). Introduction to the design of experiments and analysis of variance; random block, factorial, Latin square and Graeco-Latin square design; analysis of covariance. Prerequisite: Stat 118. Laboratory fee, $11. (Fall—day; spring—evening)

118 **Regression Analysis** (3) Staff

Lecture (3 hours), laboratory (1 hour). Regression and correlation theory; simple, partial, and multiple. Prerequisite: 3 semester hours selected from Stat 51, 53, 91, 104, 107. Laboratory fee, $11. (Fall—evening; spring—day)

119 **Bases of Statistical Decision-making** (arr.) Kern

For students in the Navy Graduate Financial Management Program only. Introduction to techniques of decision-making, with emphasis on applications rather than theory. Includes binomial distribution, normal distribu-

tion, Type I and II errors, estimation, research methodology, and problems of inference.

121 **Design of Experiments for Behavioral Sciences and Education** (3) — Kirsch

Applications of advanced experimental design to research problems in behavioral sciences and education. Prerequisite: Stat 105 or 117 and permission of instructor. (Fall—day)

122 **Forecasting Principles and Techniques** (3) — Johnson

Survey and appraisal of current economic forecasting techniques and indicators of business conditions. Preparation of an actual forecast. Prerequisite: Stat 51 or equivalent.

*123 **Introduction to Econometrics** (3) — Bennett

Construction and testing of economic models: regression theory, parameter estimation, and statistical techniques applicable to economic models. Empirical work by the student required. Prerequisite: Econ 101, 102, and a one-year sequence in calculus. (Fall or spring)

131 **Contingency Table Techniques** (3) — Kullback

Analysis of categorical data. Tests of independence, homogeneity, and interaction in simple and complex contingency tables. Tests of goodness of fit and of Markovity. Prerequisite: Stat 105 or 118, or permission of instructor.

155 **Introduction to Probability** (3) — Staff

Probability distributions, Bayes' theorem and postulate, Bernoulli's theorem and its experimental verification, mathematical expectation, laws of large numbers. Prerequisite: one entrance unit in algebra.

157–58 **Introduction to Mathematical Statistics** (3–3) — Staff

Distribution theory, sampling theory, estimation, hypothesis testing, regression analysis, experimental design. Prerequisite: differential and integral calculus. (Academic year—day and evening)

159 **Principles of Bayesian Statistics** (3) — Mann

Lecture (3 hours), laboratory (1 hour). Probability as a measure of uncertainty of knowledge: concepts and techniques of Bayesian inference. Prerequisite: 3 semester hours in introductory statistics, or equivalent. Laboratory fee, $11. (Fall or spring)

161–62 **Information Theory** (3–3) — Kullback

Elementary development of information theory and applications to communication, coding, psychology, linguistics, etc. Prerequisite: 3 semester hours selected from Stat 107, 155, 157, 159, 189. (Academic year)

165–66 **Multivariate Techniques** (3–3) — Staff

Application of multivariate statistical techniques to multidimensional research data from the behavioral, social, biological, medical, and physical sciences. Prerequisite: Stat 117, 157–58; Math 124. (Academic year—evening)

* An interdepartmental course offered by the departments of Statistics and Economics.

183 **Intermediate Statistical Laboratory** (3) Staff

Applications to advanced experimental design and other topics. Prerequisite: Stat 121 or permission of instructor. (Fall or spring)

187 **Theory of Sampling** (3) Staff

Problems of sampling and sample design. Prerequisite: Stat 91 or equivalent. (Fall—evening)

188 **Nonparametric Statistical Inference** (3) Lilliefors

Statistical inference when the form of underlying distribution is unspecified. Prerequisite: Stat 91 or equivalent. (Spring)

189–90 **Mathematical Probability and Applications** (3–3) Staff

Combinatorial analysis, conditional probability, stochastic independence, probability distributions, random variables, laws of large numbers. Prerequisite: differential and integral calculus. (Academic year—day and evening)

191 **Probabilistic Methods for Operations Research** (3) Staff

Primarily for students in the School of Engineering and Applied Science. Axiomatic theory, random variables, Bayes' theorem, some special distributions, generating functions, convergence, Poisson and Markov processes. Prerequisite: E Ad 115 or equivalent. (Fall—evening)

192 **Statistical Methods for Operations Research** (3) Staff

Primarily for students in the School of Engineering and Applied Science. Sampling, estimation, sampling distributions, hypothesis testing, the general linear hypothesis, experimental design models, elements of sequential analysis and nonparametric statistics. Prerequisite: Stat 191 or equivalent. (Spring—evening)

195 **Reading and Research in Statistics** (arr.) Staff

May be repeated once for credit. (Fall and spring)

197 **Digital Computer Programming with Applications** (3) Thomas

Lecture (2 hours), laboratory (2 hours). Use of digital computer in statistical and other computational work. Writing, debugging, and running programs on the digital computer in the University Computer Center. Prerequisite: Stat 117; or Math 32; or permission of instructor. Laboratory fee, $22. (Spring)

THIRD GROUP

201–2 **Mathematical Statistics** (3–3) Ireland

Distribution theory, sampling theory, estimation, sufficient statistics, hypothesis testing, analysis of variance, multivariate normal distribution. Prerequisite: advanced calculus. (Academic year—day)

207–8 **Operations Analysis** (3–3) Staff

Basic concepts and techniques. Introduction to simulation, linear programming, game theory, queuing theory, inventory theory, and other topics. Admission by permission of instructor. (Academic year—day)

217–18 **Advanced ANOVA and Experimental Design** (3–3) Staff

Advanced theory and application of general linear hypothesis to experimental designs. Prerequisite: Stat 157–58 or 201–2; and Math 124. (Academic year—day)

231 **Contingency Table Analysis** (3) Staff

A study of the theoretical bases underlying the analysis of categorical data. Prerequisite: Stat 201–2 or 257–58.

257–58 **Distribution Theory** (3–3) Staff

Random variables, distribution functions, moments, sequences of random variables, characteristic functions, special distributions, sampling theory, asymptotic distributions. Prerequisite: Stat 157–58 or 201–2; and Math 124, 139, 140, 157, 250. (Academic year—evening)

259–60 **Advanced Mathematical Probability** (3–3) Staff

Measure theory, probability spaces, random variables, probability distributions, sequences of random variables, conditioning, martingales. Prerequisite: Stat 189–90 and Math 250. (Academic year—evening)

263–64 **Topics in Statistical Inference** (3–3) Staff

Estimation, testing of statistical hypotheses, tests of significance, likelihood ratio, Bayesian inference and the use of prior knowledge, decision and information theory. Prerequisite: Stat 257–58; or Stat 201–2 and Math 124. (Academic year—day)

265–66 **Multivariate Analysis** (3–3) Staff

Tests of significance, homogeneity, independence, canonical and vector correlations, multivariate normal distribution, generalized Student's ratio, multivariate linear hypothesis, and analysis of variance. Prerequisite: Stat 257–58; or Stat 201–2 and Math 124. (Academic year—evening)

267–68 **Characteristic Functions** (3–3) Staff

Fourier integrals, distribution functions, inversion formulas, limit theorems, applications to the distribution problem of statistics. Prerequisite: Stat 189–90; 201–2 or 257–58; and Math 157.

269–70 **Statistical Decision Theory** (3–3) Staff

Wald's theory of decision functions. Sequential analysis. Multi-decision problems. Existence theorems, complete class theorems, and other general decision theoretic results. Prerequisite: Stat 189–90; and 201–2 or 257–58.

271–72 **Statistical Information Theory** (3–3) Kullback

Basic concepts, definitions, and formulas of information theory; their significance and general properties; inequalities of information theory and sufficiency; applications to statistical problems of discrimination and hypothesis testing. Prerequisite: Stat 201–2 or 257–58; and 259–60.

273–74 **Markov Processes** (3–3) Lilliefors

Fundamental notions of Markov chains and processes, generating functions, recurrence, limit theorems, random walks, Poisson processes, birth and death processes, applications. Prerequisite: Stat 189–90; and 201–2 or 257–58. (Academic year—day)

*275 **Econometrics I: Introduction** (3) Peskin, Bennett

Single equation models of economic behavior and associated econometric problems. Use of statistical methods for testing economic hypotheses and estimating parameters. Problems stemming from the use of nonexperimental data. Introduction to simultaneous equations problems. Empirical work by student required. Prerequisite: Econ 101, 102; Stat 157–58 or equivalent; or permission of instructor. (Fall—day and evening)

* An interdepartmental course offered by departments of Statistics and Economics.

*276 **Econometrics II: Simultaneous Equation Models** (3) Bennett
(Formerly Econometrics II: Theory and Method)
Continuation of Stat 275. Economic models and simultaneous equations systems. Identification of parameters, least squares bias, and alternative estimation methods. Block recursive systems. Prerequisitive: Stat 275. Recommended: a course in matrix theory. (Spring—evening)

281–82 **Time Series Analysis** (3–3) Shumway
Stationary and nonstationary time series, auto- and cross-correlation, power spectral analysis, multivariate normal processes, mean square estimation and regression, statistical inference, applications. Prerequisite: Stat 189–90; and 201–2 or 257–58.

283 **Advanced Statistical Laboratory** (3) Staff
Application of the University computer to complex statistical problems on an individual study basis. Admission by permission of instructor. Laboratory fee, $22. May be repeated for credit only with permission of the Department. (Fall and spring)

285–86 **Seminar** (3–3) Staff
Admission by permission of instructor. (Stat 285 and 286: fall and spring)

295 **Reading and Research** (3) Staff
May be repeated once for credit. (Fall and spring)

296 **Seminar: Professional Consulting in Statistics** (3) Kirsch
Case studies, data analysis procedures, and problems that a consultant might encounter.

297 **Problems in Mathematical Statistics** (3) Staff

298 **Seminar: Combinatorial Probability** (3) Staff

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

FOURTH GROUP

*378 **Seminar: Topics in Econometrics** (3) Staff
Limited to graduate students, primarily for doctoral candidates; offered as demand requires. A research seminar covering current econometric literature and special topics. Admission by permission of instructor.

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

* An interdepartmental course offered by departments of Statistics and Economics.

Urban and Regional Planning

Professorial Lecturer Norman Beckman
Associate Professor D.C. McGrath, Jr. *(Chairman)*
Associate Professorial Lecturers P.H. Friedly, G.A. Shunk
Assistant Professors Sherwin Greene, S.S. Fuller

Programs of study in Urban and Regional Planning leading to the degrees of *Master of Urban and Regional Planning, Master of Arts in Government, Master of Public Administration, Doctor of Business Administration,* and *Doctor of Public Administration* are offered by the School of Government and Business Administration (see pages 127–54).

SECOND GROUP

153 **Principles of Urban Planning and Design** (3)
(Formerly U&RP 53)
An introductory studio course for undergraduates. Basic elements of urban planning and design theory, techniques, and practice are studied through classroom and field problems supplemented by seminars and lectures. Students are taught the use of elementary graphic techniques in urban problem analysis and presentation of proposals. The course is intended to provide an initial survey of planner's role and responsibilities in developing and implementing creative solutions to contemporary urban problems. Admission by permission of instructor.

THIRD GROUP

P Sc 103, or equivalent, is prerequisite to all third-group courses in Urban and Regional Planning.

201 **Introduction to Urban Planning** (3) McGrath, Fuller
Introduction to history, concepts, and activities of urban planning. Discussion of trends in urbanism and the influences of technical and social change. (Fall—day and evening; spring—evening)

203 **Fundamentals of Urban Design** (3) Greene
Planning and design studio work to present planning methods and techniques, examine and apply principles of urban design and land use, analyze physiographic and economic factors affecting community growth and change, and prepare basic planning studies and proposals. Prerequisite: U&RP 201. (Fall—day and evening)

204 **Urban Development Planning** (3) Greene
Planning and design studio to investigate social, environmental, and technological factors in planning for urban transportation and other systems. Synthesis and application of comprehensive planning principles to typical problems of systems growth and development affecting larger urban centers. Team and individual projects to integrate work of several disciplines. Prerequisite: U&RP 203 or permission of instructor. Laboratory fee, $10. (Spring—evening)

205 **Seminar: Urban Housing** (3) Fuller
Consideration of housing problems growing out of increasing urban population. Social, economic, and design aspects of today's housing; foreign and domestic housing programs and policies. Prerequisite: U&RP 201. (Fall and spring—evening)

207 **Land Development Planning** (3) McGrath

Lectures and discussion of selected problems in urban and regional planning emphasizing applications of zoning, urban renewal, and special programs available for the implementation of development plans. Prerequisite: U&RP 201. (Spring—evening)

208 **Urban Transportation Planning** (3) Shunk

Review and analysis of relationships between land use and the movement of goods and people in urban areas. Consideration of transportation planning principles, policy problems, methods for analyzing demand and systems for urban travel, research and development, and roles of public agencies and private interests in planning and development of various modes. Prerequisite: U&RP 201. (Fall—evening)

209 **Urban Transportation Models** (3)

Review, analysis, and applications of mathematical models of urban development and travel used in transportation planning. Consideration of land use activity, trip generation and distribution, modal choice models, traffic assignment, and decision-making techniques. Review of detail studies, calibration, interactions, applications, and accuracy limitations of various models. Prerequisite: Mgt 218; Stat 51, 53, or 91; U&RP 208; or permission of instructor.

210 **Urban Development Economics** (3) Friedly

Consideration of basic economic forces affecting urban growth and change; relationships among cities, metropolitan areas, and regions in the context of the national economy; socioeconomic aspects of urbanization; implications of urban land development policies; interaction of public and private economic functions; basic studies and methods of economic analysis applied in urban and regional development planning. Prerequisite: U&RP 201. (Spring—evening)

215 **Advanced Planning Problems** (3) McGrath, Fuller

Planning and design studio. Investigation of complex problems of the metropolitan region, analysis of findings, formulation of proposals, and presentation of material to faculty and cooperating groups. Multidisciplinary team and individual planning projects. Prerequisite: U&RP 204. Laboratory fee, $10. (Fall)

218 **Metropolitan and Regional Planning** (3) Fuller and Staff

Planning and design studio projects undertaking area-wide analyses of complex regions and applying advanced techniques to prepare comprehensive development policies and plans for projected growth. Collaborative projects requiring problem analysis, synthesis, and development of policies and proposals jointly by several graduate study disciplines. Prerequisite: U&RP 204 or permission of instructor. Laboratory fee, $10. (Spring—evening)

221 **Land Development Law** (3) Brown*

Study of the various techniques relative to land development: the status of the federal government as landlord, vendor, and purchaser; the competitive private market as a form of planning in comparison to governmental planning programs; the functions of the lawyer in the modern real estate transaction involving land acquisition, licenses, codes and permits, development, construction, sale, and financing. Consideration of new

* Mr. Brown is Professor of Law in the National Law Center

forms and concepts of ownership, transportation programs as a part of land development planning, the migration of people and industry as a planning and control factor, and private and public "new town" developments. (Same as Law 501). (Fall—day)

222 **Land Use Planning** (3) Nutting

Selected problems in urban redevelopment and housing, particular emphasis on programs under current federal and state legislation. (Same as Law 571 (2))*. (Spring—day)

240 **Federal and State Urban Policy Development** (3) Staff

Investigation of contemporary trends in the evolution of federal and state governmental functions and programs affecting urban growth and development policy. Special consideration of the planning function in the evolving relationships between units of federal, state, and metropolitan agencies.

295 **Urban Research** (3) Staff

Directed research and investigation of special problems in community development. May be repeated once for credit. (Fall and spring)

299 **Thesis Seminar** (3) Staff

Examination of thesis standards, research philosophy, and methodology. (Fall and spring)

300 **Thesis Research** (3) Staff

(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Business Administration or Doctor of Public Administration general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Business Administration or Doctor of Public Administration candidates. May be repeated for credit. (Fall and spring)

Zoology

See "Biological Sciences."

* Students registering for U&RP 222 make special arrangements with instructor for supplementary assignments equivalent to one additional semester hour. Dr. Nutting is Professor of Law in the National Law Center.

FACULTY AND STAFF OF INSTRUCTION

COLUMBIAN COLLEGE OF ARTS AND SCIENCES

GRADUATE SCHOOL OF ARTS AND SCIENCES

SCHOOL OF EDUCATION

SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION

SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS

EMERITI

Antonio Alonso, *Professor Emeritus of Spanish*
M.A. 1922, Indiana University

Ruth Harriet Atwell, *Professor Emeritus of Physical Education for Women*
Ph.B. 1918, Denison University; M.A. in Ed. 1933, George Washington University

Gretchen Rogers Bolwell, *Professor Emeritus of German*
B.A. 1930, M.A. 1931, George Washington University; Ph.D. 1938, Johns Hopkins University

Robert Whitney Bolwell, *Professor Emeritus of American Literature*
B.A. 1916, Case Western Reserve University; M.A. 1917, Ph.D. 1921, Columbia University; Litt.D. 1957, George Washington University

Paul William Bowman, *Professor Emeritus of Biology*
B.A. 1924, University of Pennsylvania; M.A. 1928, George Washington University; Ph.D. 1930, University of Virginia

Elizabeth Burtner, *Professor Emeritus of Physical Education, in Residence*
B.A. 1927, Hood College; M.A. 1935, Columbia University

Elbridge Colby, *Professor Emeritus of Journalism*
B.A. 1912, M.A. 1913, Ph.D. 1922, Columbia University

Oswald Symister Colclough, *Professor Emeritus of Law; Dean of Faculties Emeritus; Emeritus Director of the Patent, Trademark, and Copyright Research Institute*
B.S. 1920, U.S. Naval Academy; LL.B. 1935, Sc.D. 1961, George Washington University; LL.D. 1946, Muhlenberg College

Alan Thomas Deibert, *Professor Emeritus of Romance Languages*
B.A. 1918, Gettysburg College; M.A. 1922, Harvard University

William Webster Diehl, *Professor Emeritus of Mycology*
B.A. 1914, Miami University; M.S. 1915, Iowa State University of Science and Technology; Ph.D. 1932, Harvard University

James Harold Fox, *Professor Emeritus of Education*
B.A. 1925, M.A. 1926, University of Western Ontario, Canada; Ed.M. 1936, Ed.D. 1937, Harvard University

Thomas Willard Holland, *Professor Emeritus of Labor Economics*
B.A. 1923, University of Michigan; LL.B. 1934, Columbia University; Ph.D. 1939, University of Wisconsin

Averett Howard, *Professor Emeritus of English Composition*
B.A. 1922, University of California, Berkeley; M.A. 1940, Cornell University

Thelma Hunt, *Professor Emeritus of Psychology, in Residence*
B.A. 1924, M.A. 1925, Ph.D. 1927, M.D. 1935, George Washington University

Everett Herschel Johnson, *Professor Emeritus of Statistics, in Residence*
B.A. 1926, DePauw University; M.A. 1929, Lehigh University; Ph.D. 1942, University of Michigan

Francis Edgar Johnston, *Professor Emeritus of Mathematics*
B.A. 1921, George Washington University; M.A. 1923, Ph.D. 1926, University of Illinois

Elmer Louis Kayser, *Professor Emeritus of European History; Dean Emeritus of the Division of University Students*
B.A. 1917, M.A. 1918, LL.D. 1948, George Washington University; Ph.D. 1932, Columbia University

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APPENDIX: RECENTLY ESTABLISHED REGULATIONS

THE FOLLOWING UNIVERSITY REGULATIONS are under review and may be subject to change in connection with the establishment of judicial processes. Bulletins and handbooks incorporating any changes will be issued as appropriate.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on October 19, 1968:

Whereas, safety and order are essential preconditions of the learning process, and indeed of the very concept of a university; and

Whereas, The George Washington University is committed to protection of free speech and freedom of assembly, and to safeguarding the right of lawful protest on campus; and is committed equally to maintaining the peace and safety of the campus, in the knowledge that all rights are in jeopardy when violence and civil disorder prevail over law and reason;

Now, therefore, be it resolved by the Senate of The George Washington University: that in the event a demonstration at this University exceeds the bounds of free assembly and lawful advocacy, and demonstrators are engaging in unlawful acts which cause or imminently threaten injury to persons or property, or which obstruct or interfere with normal and necessary University activities, this body affirms the authority of the President, or other University officials designated to act in his absence, to take such reasonable steps, if possible after consultation with the Chairman of the Executive Committee of the University Senate and the President of the Student Body, as are required to restore and preserve order; including, if deemed necessary and appropriate, suspension of students or faculty engaging in such acts, and use of such law enforcement personnel as are needed to effect the removal, arrest, and prosecution of law violators. Any such suspension shall be reviewed by an appropriate tribunal as soon after order is restored as is practicably possible.

The following was approved by the University's Board of Trustees on October 19, 1968:

Any student suspended from The George Washington University on the grounds of exceeding the bounds of free assembly and lawful advocacy shall have his suspension reviewed by the Hearing Committee on Student Affairs of The George Washington University as soon after order is restored as is practicably possible.

The following resolution, submitted by the Student Life Committee, was approved by the University's Board of Trustees on October 19, 1968:

Be it resolved that The George Washington University affirms its traditional commitment to freedom of expression (a) by continuing to permit business and government organizations which are recruiting employees to conduct their activities at designated places on campus, and (b) by placing no obstacle to students who may wish to protest the presence of such recruiters, provided, however, that such protest shall be orderly and shall not impede or disrupt the recruiter in his activities.

The University affirms its place as a forum for the free exchange of ideas (a) by assuring that guests invited to speak on this campus at duly scheduled meetings shall have the right to appear and to be heard, and (b) by sanctioning the freedom of students to express dissent from the views of the speaker, provided, however, that that expression of dissent be orderly and nonobstructive.

The University distinguishes between orderly protest and resistance-by-obstruction; it accepts the former as a legitimate expression of dissent while rejecting the latter as an abridgement of the freedoms of the individuals who may be its object.

The following was approved by the University's Board of Trustees on October 19, 1968:

The George Washington University is opposed to discrimination based on race, color, or creed. Such discrimination may have appeared in campus organizations in the past. In the future, however, no organization can be recognized or supported by the University unless it provides continued assurance of nondiscrimination in membership practices and in intent, considered adequate by relevant committees and officers of the University.

The following was approved by the University's Board of Trustees on October 19, 1968:

The University cannot condone violations of law, including violation of those laws which proscribe possession, use, sale, or distribution of certain drugs. Members of the academic community should know that administrative action, which may include dismissal from the residence halls, revocation of other privileges, or suspension or dismissal from the University, may be taken in order to protect the interests of the University and the rights of others.

The Board of Trustees reaffirms the responsibility of the President and the Faculty to continue to implement this policy.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on January 16, 1969:

Be it resolved by the Senate of The George Washington University: Any member of the University (including as members of the University all persons having a formal connection with the University)

(a) who engages in conduct that unreasonably obstructs teaching, research, and learning, or

(b) who unreasonably obstructs free access to members or guests of the University or to University buildings, or

(c) who disobeys general regulations of the University, or

(d) who damages University property or injures members or guests of the University,

may be punished for his conduct by dismissal from the University, or by some lesser disciplinary action, through procedures established within the University for the government of its members.

In order to insure due process, any student subject to dismissal or other disciplinary action on the grounds of violating any of the premises of this resolution shall have, at his discretion, the right of review of the action by the University Hearing Committee on Student Affairs.

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THE CALENDAR 1971–72*

1971–72	**FALL SEMESTER**
September 9	Registration *Thursday*
September 10–13	Orientation for first-year students *Friday–Monday*
September 13	Opening Assembly *Monday*
September 14	Classes begin *Tuesday*
October 24	Veterans Day (holiday) *Monday*
November 24	Thanksgiving recess begins after last class *Wednesday*
November 29	Classes resume *Monday*
December 18	Christmas recess begins after last class *Saturday*
January 3	Classes resume *Monday*
January 17–22	Examination period *Monday–Saturday*
1972	**SPRING SEMESTER**
January 20	Registration *Thursday*
January 24	Spring-semester classes begin *Monday*
February 21	Winter Convocation (holiday) *Monday*
March 25	Spring recess begins after last class *Saturday*
April 3	Classes resume *Monday*
May 20	Last day of spring-semester classes *Saturday*
May 22–27	Examination period *Monday–Saturday*
May 28	Commencement *Sunday*

*The examination schedule and semester breaks do not apply to third- and fourth-year students. See *School of Medicine Schedule of Classes*.



THE SCHOOL OF MEDICINE*

Dean of the Medical Center John Parks
Associate Deans of the Medical Center J.J. Feffer, C.A. Lowe, F.N. Miller, Jr.

THE FACULTY

Professors J.P. Adams, P.C. Adkins, F.D. Allan, L.K. Alpert, Seymour Alpert, M.F. Armaly, J.M. Bailey, R.H. Barter, Leon Bernstein, Brian Blades, Halla Brown, T.M. Brown, C.A. Caceres, Paul Calabrisi, T.C. Chalmers, J.D. Chase, C.S. Coakley, L.R. Culbertson, F.C. Derrick, Jr., Spyros Doxiadis *(Visiting)*, W.R. Duryee *(Research)*, B.S. Epstein, J.M. Evans, H.L. Feffer, J.J. Feffer, C.M. Goss *(Visiting)*, P.P. Griffin, J.A. Halsted, Murdock Head, F.P. Heald, R.S. Higdon, J.C. Houck, Rudolph Hugh, W.N. Jensen, T.N. Johnson, G.A. Kelser, Jr., R.A. Kenney, C.T. Klopp, S.L. Leikin, G.S. Letterman, R.S. Lourie, M.J. Malone, H.G. Mandel, A.M. Margileth, J.W. Millar, F.N. Miller, Jr., J.P. Naughton, William Newman, Leo Oliner, Sean O'Reilly, John Parks, R.C. Parlett, A.E. Parrish, R.H. Parrott, T.M. Peery, T.E. Piemme, J.G. Randolph, J.E. Rankin, Mary Louise Robbins, M.J. Romansky, J.G. Sites, B.W. Smith, J.C. Smith, W.W. Stanbro, Harold Stevens, Irene Tamagna, I.R. Telford, C.S. Tidball, Elizabeth Tidball *(Research)*, C.R. Treadwell, G.V. Vahouny, F.W. Wolff, Leon Yochelson

Clinical Professors M.G. Alper, W.S. McCune, H.V. Rizzoli

Associate Professors L.F. Affronti, T.C. Alford, J.C. Aller, Gordon Avery, W.R. Ayers, J.M. Bacos, K.L. Becker, Alexander Breslow, Lawrence Brettschneider, Marie Cassidy, Tsung Cheng, J.B. Christensen, H.W. Clark, Jr. *(Research)*, V.H. Cohn, Jr., Milton Corn, J.A. Curtin, Leon Cytryn, Angelo D'Agostino, D.W. Delaney, W.O. Dobbins III, J.A. Dowling, S.E. Fabro *(Research)*, W.R. Felts, Jr., J.D. Finkelstein, R.C. Fowler, J.L. Fox, H.M. Grigorian, Margaret Gutelius, C.R. Hartman, Ariel Hollinshead *(Research)*, Wellington Hung, Dorothy Huntington *(Research)*, F.S. Jannotta, W.R. Jondorf *(Research)*, Paula Kaiser, R.P. Kaufman, Peter Kenmore, Marie-Louise Kennedy, K.S. Kim *(Research)*, N.C. Kramer, L.S. Lessin, J.R. Lilly, Joseph Lindsay, Jr., R.G. Loudon, W.L. Marsh, D.J. Massaro, Rashid Massumi, A.F. Mastellone, Paul Mazel, J.E. McClenathan, Larry McGowan, G.A. Morales, Mahmoud Mourad, C.F. Murphy, W.J. Nelson, A.F. North, Jr.,

*The Faculty, Executive Faculty, Dean's Council, and committee members are for the academic year 1970–71.

The President of the University, the Vice President for Academic Affairs, the Registrar of the University, and the Director of Admissions of the University are ex officio members of the Faculty and the Executive Faculty.

J.B. O'Connell, J.C. Penhos *(Research)*, Arthur Peschin, Lawrence Pierce, H.C. Pierpont, Lois Platt, Melvin Reich, Rebecca Rieger *(Research)*, Patricia Russell, L.P. Scott III, C.W. Shilling, P.E. Shorb, Jr., Irene Siu, E.V. Soto, K.M. Stevens, J.A. Straw, N.T. Tsangaris, J.K. Viktora *(Research)*, Mary Watt, Benny Waxman, Don Wenger

Associate Clinical Professors J.J. McFarland, Jr., W.P. McKelway

Assistant Professors E.N. Albert, Yousef Al-Doory, R.P. Altman, G.P. August, G.J. Augustin, J.S. Bailey *(Research)*, Ann Barnet, W.H. Barton, P.M. Berkman, C.M. Berlin, Jr., Gerrit Besselaar, C.D. Brandt, C.H. Chan, Yang-Ming Chu, Mary Coleman, R.M. Coleman, J.K. Cooper, S.H. Danovitch, Mervyn Elgart, Gloria Eng, S.A. Fagen *(Research)*, D.S. Friendly, Whei-Rung Fu, Linda Gallo *(Research)*, P.A. Gorman, Richard Granke, Elsa Greenberg *(Research)*, L.M. Greenberg, G.A. Hahn *(Research)*, Allan Hall, J.S. Haller, Suzanne Hammersberg, Paul Hamosh, Barbara Howard *(Research)*, Kun-yen Huang, F.L. Hurley, M.J. Jackson, C.B. Jacobson, B.F. Johnson *(Research)*, E.N. Kassira, Robert Keimowitz, S.G. Kent, H.W. Kim, C.H. Klingenmaier, Philip Klubes, Marilyn Koering, E.N. Kraybill, S.J. Kurzbard, J.R. Landoll, John LaRosa, R.A. Lavine, Ann Lodge *(Research)*, Massoud Majd-Ardekani, Hildegard Manitsas, Emanuele Mannarino, J.L. Marlow, Nasser Movassaghi, G.H. Nachnani, Karin Nelson, M.N. Ozer, F.A. Peck, L.W. Perry, J.R. Puig, H.B. Richardson, Jr., C.A. Rigg, J.C. Rios, D.I. Robbins, Barbara Roth-Schechter, H.L. Rudman, V.K. Saini, J.R. Shapiro, T.R. Shworles, K.B. Singh, Elizabeth Stephenson, Lovisa Tatnall *(Research)*, Glenn Walker, D.W. Watkins, Anna Weihrer, M.W. Werthmann, Jr., D.E. Winer, Karl Wipplinger, Philip Witorsch, G.L. Wright, Jr., B.C. Zook

Assistant Clinical Professor J.L. Levine

Instructors Sidney Abraham, Kathryn Anderson, Minoru Araki *(Research)*, L.F. Arias-Bernal, J.I. Auñón *(Research)*, Eduardo Azcarate, Catherine Chura, J.B. Craft, Jr., K.J. Dickie, Glenna Fitzgerald, Anne Fletcher, Ma. Eleanor Flores, Mary Flumerfelt, W.P. Fortune, S.I. Granger, Raymond Haddad, Hiltje Irausquin *(Research)*, Hemant Joglekar, Vincent Johnson, Jr., Sau-Wah Kwan, S.R. Lane, G.S. Lang, David Lee, F.B. Liebler, J.L. Mabon, Dertad Manguikian, Shirley McMahon, D.R. Meers, S.H. Mendelson, D.B. Murray *(Research)*, Karen Olness, Beneta Peacock, R.E. Perkins, Manoochehr Pooya, Olga Pruna, K.R. Rao, Monouchehr Rokni, Mary Salte, R.J. Santos, R.K. Sarin, F.A. Siegel *(Research)*, Jane Todaro, W.P. Tunell, S.G. Werner, J.R. Whiteman *(Research)*, K.D. Williams, Hoyoko Yahanda

Associate Dean of the Medical Center, for Research C.A. Lowe

Administrator of the University Hospital and Clinic V.F. Ludewig

THE DEAN'S COUNCIL*

L.K. Alpert, Halla Brown, Milton Gusack, F.P. Heald, J.G. Sites, Harold Stevens, C.W. Thompson, C.R. Treadwell, N.T. Tsangaris

* The Dean and Associate Deans of the Medical Center, the Medical Director of the University Hospital, the Medical Director of the University Clinic, the Administrator of the University Hospital and Clinic, and the President of the Medical Alumni Association are ex officio members of the Dean's Council.

EXECUTIVE FACULTY

Professors J.P. Adams, P.C. Adkins, M.F. Armaly, C.A. Caceres, Paul Calabrisi, C.S. Coakley, L.R. Culbertson, F.C. Derrick, B.S. Epstein, J.J. Feffer, P.P. Griffin, Murdock Head, R.S. Higdon, W.N. Jensen, G.A. Kelser, Jr., R.A. Kenney, C.T. Klopp, H.G. Mandel, A.M. Margileth, J.W. Millar, F.N. Miller, Jr., Sean O'Reilly, John Parks, R.C. Parlett, A.E. Parrish, R.H. Parrott, T.M. Peery, J.E. Rankin, Mary Louise Robbins, J.G. Sites, B.W. Smith, J.C. Smith, W.W. Stanbro, Harold Stevens, I.R. Telford, C.S. Tidball, C.R. Treadwell, Leon Yochelson

Clinical Professors M.G. Alper, W.S. McCune, H.V. Rizzoli

Associate Professors W.E. Anderson, V.H. Cohn, Jr., R.P. Kaufman, W.J. Nelson

Associate Clinical Professors J.J. McFarland, Jr., W.P. McKelway

Assistant Professor Mervyn Elgart

Assistant Clinical Professor J.L. Levine

Associate Dean of the Medical Center, for Research C.A. Lowe

Administrator of the University Hospital and Clinic V.F. Ludewig

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R.M. Coleman, Milton Corn, J.G. Randolph, B.W. Smith, J.C. Smith, Elizabeth Tidball

COMMITTEE ON RESEARCH

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*The Dean and Associate Deans of the Medical Center, the Medical Director of the University Hospital, the Medical Director of the University Clinic, the Administrator of the University Hospital and Clinic, and the President of the Medical Alumni Association are ex officio members of all committees.

COMMITTEE ON LIBRARY

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T.C. Alford, F.D. Allan, Alexander Breslow, Halla Brown, G.V. Vahouny, J.A. Crawford *(Student Representative)*

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E.N. Albert, M.F. Armaly, Marie Cassidy, W.O. Dobbins III, Marilyn Koering, I.R. Telford

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W.R. Ayers, David Benfer, Catherine Breen, Marion Corddry, R.P. Kaufman, Jane Lingo, J.F. Mermel, R.S. Woodward *(Student Representative)*

ADVISORY COMMITTEE ON REHABILITATION

J.P. Naughton, *Chairman*
H.L. Feffer, Mahmoud Mourad, Sean O'Reilly, Irene Tamagna

ADVISORY COMMITTEE ON TEACHING AIDS

F.D. Allan, *Chairman*
Gordon Avery, R.A. Kenney, H.C. Pierpont, W.W. Stanbro, J.A. Straw, R.W Schulz *(Student Representative)*

DATA PROCESSING STEERING COMMITTEE

V.F. Ludewig, *Chairman*
M.F. Armaly, C.A. Caceres, C.S. Coakley, J.K. Cooper, H.W. Dorsey, R.P Kaufman, R.A. Lavine, J.W. Millar, F.J. Naramore, C.S. Tidball

STUDENT ADVISORY COMMITTEE TO THE DEAN

D.H. Burstein, B.D. Burtoff, D.R. Howard, J.H. McClenathan, R.W. Schulz, L.A. Shapiro, H.M. Uman, R.S. Woodward

General Information

THE SCHOOL OF MEDICINE OF GEORGE WASHINGTON UNIVERSITY has a distinguished history that goes back more than a century. In March, 1825, the School opened with the intention of building "a medical school commensurate with the progress and demands of a rising metropolis, and the improvement of service throughout the country." The School of Medicine, the eleventh oldest in the country, has met this responsibility by providing its students with a foundation in the medical sciences upon which they have built medical careers in practice, teaching, research, or administration.

In 1844, the School took on a new dimension when Congress granted it the use of the Washington Infirmary. Thus one of the earliest general teaching hospitals in the Nation was established in Washington.

At the turn of the century the School was located at its present site—in the center of Washington—close to world-renowned library facilities, comprehensive government medical museums, and numerous federal medical research and scientific establishments.

The distinguished history of the George Washington University School of Medicine closely parallels academic advances and medical progress of the Nation. The School has contributed to both.

The George Washington University Medical Center, established in 1966, consists of the School of Medicine, the University Hospital, the University Clinic, and affiliated hospitals.

OBJECTIVES

The purpose of the School of Medicine is to prepare men and women in the art and science of medicine to meet the health needs of a growing, ever-changing society. It is the responsibility of the School to provide its students with a systematic plan of instruction in the basic medical sciences, with well-guided



clinical experience, with opportunities for expression in research, and with a philosophy in keeping with the highest ethics of the profession.

To carry out its program, the School maintains a well qualified faculty and makes use of facilities which provide exceptional opportunities for research and clinical training in the Washington metropolitan area.

PLAN OF INSTRUCTION

The Faculty and Administration of the School of Medicine have developed and initiated a program of medical education through careful study of past performance, present opportunity, and future need.

Students differ widely in their interests and abilities. Each student is encouraged to maximal achievement within his own limits. This is accomplished by a balanced program of required and elective courses that permit individual scholarly development in specialized medical sciences and research.

The curriculum provides graduated instruction, beginning with the basic medical sciences and expanding to include the more complex aspects of health maintenance and care of the sick. It provides a broad basic preparation for a career in medicine.

In the first year, the schedule begins with an orientation period designed to introduce the new students to the Faculty, the upperclassmen, and the environment for their medical education.

The first semester is devoted to the study of the sciences (anatomy and biochemistry) concerned with the structure and composition of the normal human body. In the second semester of the first year, the science of normal function is further emphasized by courses in physiology. These studies of the normal provide a basis for emphasis on health maintenance, which is a strong positive characteristic of the University's new teaching program. During the second semester the student is also introduced to the concept of disease in a course in microbiology, where the various microbial agents and their effects upon the human body are studied. Elective courses are offered in the second semester of the first year and provide an opportunity for the student to begin the development of special interests under the guidance of skilled advisers.

The basic courses of the first semester of the second year are pathology and pharmacology. In the former the student learns the nature and causes of disease as well as the alterations produced by disease in the tissues and fluids of the human body. He learns to recognize and evaluate the significance of the abnormal. Pharmacology provides an understanding of the mode of action of the various agents employed in the treatment of the sick, and emphasizes the safest and most effective means for their use. Opportunities for elective study are increased during the second year.

The second semester of the second year is planned to acquaint the student with the principles and methods of clinical diagnosis and therapy, and to develop in him an awareness of the physician's responsibility to his patients. The basic concepts of laboratory medicine are taught in special laboratory facilities. During the second semester of the second year, three half-days are available each week for electives.

During the final 20 months of the curriculum, each student has a 13-month clinical clerkship assignment in the University Hospital and Clinic and in affiliated hospitals. Patients with a wide variety of illnesses are assigned to each

student for close personal study under the guidance of a faculty skilled in the various specialties of medical practice. In the course of the clerkship, the student is given increasing responsibility as he demonstrates competence and professional maturity.

During a 24-week elective period, each student has an opportunity to explore general practice, specialty practice, or areas of research which may be of help in deciding the direction of his career. Students with exceptional interests and proven ability may be permitted to spend their elective period in other universities, including those of foreign countries, but most students will find ample opportunities in the University's own published schedule of approximately 150 different electives for upperclassmen.

Courses in the recently established Department of Clinical Engineering are available for elective credit to students interested in this increasingly important field.

CURRICULUM

FIRST YEAR	TERM I (16 weeks)	**A. The Basic Medical Sciences** ANATOMY AND BIOCHEMISTRY
	TERM II (16 weeks)	PHYSIOLOGY AND MICROBIOLOGY plus 4 semester-hour credits of electives in Anatomy and Biochemistry
(16-week vacation)		
SECOND YEAR	TERM III (16 weeks)	PATHOLOGY AND PHARMACOLOGY plus 4 semester-hour credits of electives in Physiology and Microbiology
	TERM IV (16 weeks)	**B. Introduction to Clinical Medicine** PHYSICAL DIAGNOSIS, LABORATORY MEDICINE, PSYCHIATRY, INTRODUCTORY CLINICAL LECTURES plus 4 semester-hour credits of electives in Pathology, Pharmacology, and others
(16-week vacation)		
THIRD AND FOURTH YEARS (the last 88 weeks in rotation, including 4-week vacation)	TERM V (4 weeks)	
	CLINICAL CLERKSHIPS (56 weeks)	**C. Patient Care** INPATIENT CLERKSHIPS: Psychiatry (4 weeks), Medicine (12 weeks), Surgery (12 weeks), Obstetrics and Gynecology (8 weeks), Pediatrics (8 weeks) OUTPATIENT CLERKSHIPS: General Medicine and Medical Specialties (8 weeks), Emergency Room (4 weeks)
	ELECTIVES (24 weeks)	**D. Career Electives** SUPPLEMENTARY CLINICAL CLERKSHIPS OR BASIC SCIENCE OR CLINICAL RESEARCH

DEGREES

The four-year program of the School of Medicine, described above, leads to the degree of Doctor of Medicine.

In cooperation with Columbian College of Arts and Sciences, a seven-year curriculum leading to the combined degrees of Bachelor of Arts and Doctor of Medicine is offered. In cooperation with the Graduate School of Arts and Sciences programs leading to the combined degrees of Master of Science and Doctor of Medicine or Doctor of Philosophy and Doctor of Medicine are offered.

The departments of the School of Medicine cooperate with the Graduate School of Arts and Sciences in offering the degree of Master of Science in the fields of anatomy, biochemistry, genetics, microbiology, mycology, pathology, pharmacology, and physiology; and in directing the research of candidates for the degree of Doctor of Philosophy in more than fifty fields.

EQUIPMENT AND BASIC SCIENCE FACILITIES

Facilities for the School of Medicine are located at 1331, 1335, 1337, and 1339 H Street, N.W., in downtown Washington.

Administrative Offices.—The administrative offices of the School, 1331 H Street, consist of the offices of the Dean of the Medical Center, Medical Admissions, Research Administration, and the Medical Alumni Association.

Medical School Buildings.—In the buildings housing the School of Medicine, 1335 and 1337 H Street, there are lecture rooms, classrooms, students' rooms, and the following laboratories: anatomy, biochemistry, microbiology, pathology, pharmacology, and physiology. The laboratories are fully equipped to enable students to pursue adequately the laboratory courses and to acquire the technical skill necessary in modern clinical and investigative work.

Research Building.—The Research Building, 1339 H Street, houses special laboratories for graduate and staff research in the departments of Anatomy, Biochemistry, Microbiology, Pharmacology, and Physiology. Special facilities are provided for the study of radioactive compounds, for tissue-culture techniques, and for virologic procedures. Qualified students are invited to participate in certain aspects of the research program either on a volunteer basis or with the support of special Research Scholarships.

Teaching Aids.—This administrative unit of the School of Medicine directs the activities of the following service functions: Medical Illustration and Photography, Audio-visual Facilities (including television), and Xerox Duplication.

Medical Library.—The Medical Library, in well-equipped quarters on the first floor of 1339 H Street, N.W., contains 40,000 carefully selected volumes, including the new medical works and the principal medical journals.

Interlibrary loan service is maintained with other medical and scientific libraries.

The Medical Library is open from 7:30 a.m. to 10 p.m. each class day, Monday through Friday; from 8:30 a.m. to 5 p.m. Saturday; and from 12 noon to 5 p.m. Sunday.

A branch of the Medical Library is maintained in the University Hospital for the use of the resident physicians, interns, and students. It is open every day from 8:30 a.m. to 11 p.m.

CLINICAL FACILITIES

Students at the George Washington University School of Medicine receive clinical experience at the University Hospital, at the University Clinic, and at affiliated hospitals.

The George Washington University Hospital.—This 550-bed hospital, staffed and directed by the Faculty of the School of Medicine, provides excellent clinical opportunities for the instruction of medical students. The Medical Director, Chairmen of Departments, and Directors of Sections are responsible for the supervision of patient care. Under guidance, the individual student has direct responsibility to patients. Clinical conferences are held in which the history of patients, laboratory records, and the physical and pathological findings are presented and correlated.

The Meyer Pavilion, a new addition, has greatly enriched the facilities of the University Hospital by making available new monitored operating rooms; a clinical research unit; a radioisotope laboratory; and radiotherapy facilities, which include a linear accelerator.

The University Clinic.—The University Clinic is housed in a 13-story building adjacent to the University Hospital. Clinic facilities for each Hospital Service and cancer detection are available. Students are assigned for instruction in the University Clinic.

Children's Hospital.—This is one of the largest and best known hospitals for children in the United States. Medical students receive training and clinical experience in pediatrics on both clinic and inpatient services. Special lectures and clinical work in child psychiatry are given in Children's Hospital.

Columbia Hospital for Women.—This 150-bed hospital, situated only two blocks from the University Hospital, is utilized by medical students at George Washington University for clinical training in obstetrics and gynecology. Each year about 10,000 patients are admitted, and there are 12,000 outpatient visits. Almost 5,000 deliveries and 4,500 gynecological operations are performed annually. Columbia Hospital for Women is an affiliated hospital for residency training in Obstetrics and Gynecology in the George Washington University Medical Center Program.

District of Columbia General Hospital.—The District of Columbia General Hospital, one of the largest general hospitals in the country, is a teaching facility for students in the School of Medicine.

The hospital has a bed capacity of approximately 750. It is the principal facility for the care of the indigent sick of the community. Annually, the outpatient department has over 180,000 clinic visits; approximately 83,000 patients register in the emergency room, and 22,000 are admitted to the hospital. This is the largest emergency service in the District, and a great variety of acute medical and surgical problems are examined and treated.

Fairfax Hospital.—This new and already expanding 300-bed voluntary community teaching hospital serves a burgeoning suburban area and provides all clinical services including psychiatry. Each year over 15,500 patients are admitted, 3,500 babies delivered, 8,000 surgical operations performed, and 36,000 persons examined and treated in the Emergency Suite. Fairfax Hospital offers a rotating internship program, a School of Medical Technology, and clinical facilities for a School of Practical Nursing. Students of the School of Medi-

cine serve at this hospital in clinical clerkship and elective programs. Fairfax Hospital is an affiliated hospital for residency training in Obstetrics and Gynecology in the George Washington University Medical Center Program.

St. Elizabeths Hospital.—St. Elizabeths Hospital, established by an act of Congress in 1855, is a federal psychiatric hospital administered under the Department of Health, Education, and Welfare. This hospital provides for the treatment, care, and general well-being of approximately 7,500 patients of whom 5,900 are resident. The facility includes a completely approved General Hospital to meet the needs for medical and surgical care and functions with a full-time staff within the hospital plus attending physicians in various specialties. The hospital maintains an up-to-date medical library.

Medical students of George Washington University utilize the facilities of St. Elizabeths for clinical psychiatric training. Opportunities for research are enhanced by a cooperative arrangement with the National Institute of Mental Health of the United States Public Health Service.

Veterans Administration Hospital.—This new 700-bed hospital, which replaces the Mt. Alto Veterans Administration Hospital and the Veterans Administration Outpatient Clinic, was opened in May, 1965.

In addition to the medical, surgical, psychiatric, neurological, tubercular, and physical medicine and rehabilitation services, there is a large outpatient program; an extensive medical research program; programs in open heart surgery, cobalt therapy, and renal dialysis; a metabolic program; and a specially designed Administrative Research Laboratory.



Washington Hospital Center.—Opened in 1958, this 829-bed private, voluntary institution serves the greater Washington area through a triad of activities: patient care, teaching, and research. The Center is the tenth busiest of more than 7,000 hospitals in the United States and the second busiest private hospital in terms of inpatient admissions. A very active emergency service cares for more than 48,000 patients a year, and the 36 clinics provide all major clinical service except pediatrics for about 82,000 outpatients yearly. In addition to an extensive approved internship and residency program, the Center offers organized instruction for nurses, laboratory and X-ray technicians, medical secretaries, and other health-related vocations.

GOVERNMENT MUSEUMS

The Armed Forces Institute of Pathology, on the grounds of Walter Reed Army Medical Center, affords unexcelled opportunity for study of conditions met in general medicine and surgery as well as those of special military significance. Its collection of anatomical and pathological specimens comprises material received from all areas of the world and is unequalled in this country. The Museum of Hygiene, the National Museum, the Smithsonian Institution, the Botanic Gardens, and the various collections of the Department of Agriculture all afford opportunity for study of materials of special interest in various areas of medicine and its allied sciences.

The Degree of Doctor of Medicine

ENTRANCE REQUIREMENTS

A MINIMUM OF 90 SEMESTER HOURS must have been earned in an accredited institution of higher learning. Credits earned in a professional school can be applied to the fulfillment of this minimum requirement only if they are acceptable by the applicant's college or university toward a Bachelor's degree in Arts or Science. A credit under the quarter system is two-thirds of a semester hour.

It is advantageous to complete four full years of undergraduate work. Only exceptional students are accepted upon completion of the minimal requirements.

The following courses must be completed with satisfactory achievement before the applicant can be certified for matriculation. All required science courses must include sufficient laboratory work to give assurance of familiarity with the experimental methods and techniques of the disciplines.

1. **Biology:** 8 semester hours, including 4 hours of laboratory. This may be either in general biology or zoology but may *not* include separately credited courses in botany.
2. **Chemistry:** 8 semester hours of general inorganic chemistry (which may include qualitative analysis), including 4 semester hours of laboratory; and 6 to 8 semester hours of organic chemistry, including laboratory.
3. **Physics:** 8 semester hours, including at least 2 semester hours of laboratory.
4. **English:** 6 semester hours in composition and literature. This may be the usual introductory college course or its equivalent.

While not required for admission, courses in embryology, histology, genetics, and mathematics are strongly recommended.

ADMISSION PROCEDURE

The applicant should give careful attention to the entrance requirements, supplying all the information asked for on the application and furnishing the School with all the required credentials. An applicant cannot be considered until the following are received:

1. A fully completed *Application for Admission.*
2. Official transcripts of record from the registrar of *each* college, university, professional school, or other medical school attended—including summer sessions. Inclusion of transferred credits on a transcript will *not* serve in place of the transcript from the school where the credits were earned. Applicants currently in attendance should request official transcripts of record to date and send *supplemental transcripts* as soon as courses are completed and grades are recorded.
3. Letters of recommendation from the applicant's premedical advisory committee *or* from the references given in the application.
4. The results of the Medical College Admission Test, sponsored by the Association of American Medical Colleges. Information concerning this test may be obtained from premedical advisers or the Association of American Medical Colleges, Division of Educational Measurement and Research, One Dupont Circle, N.W., Washington, D.C. 20036.
5. A check or money order made out to George Washington University in the amount of $25 to cover the cost of evaluating credentials.

ADVANCED STANDING

The School of Medicine's curriculum is such that admission with advanced standing is ordinarily limited to the third year. Applicants for admission to the second year will be considered in exceptional circumstances. The applicant must:

1. Be or have been a regularly registered student in a school of medicine which is a member or an affiliate member of the Association of American Medical Colleges.
2. Be in good standing and eligible to continue in the school where he is currently enrolled, or eligible to re-enter that school if his education has been interrupted.
3. Have completed a course of study at least equivalent to that required for advancement to the year for which he is applying had he been a student in the George Washington University School of Medicine. For admission to the second year, he must have completed all work in anatomy, biochemistry, microbiology, and physiology. For admission to the third year, he must have completed didactic courses in medicine, surgery, obstetrics and gynecology, pediatrics, and psychiatry.
4. Have the endorsement of the dean of his school of medicine or his authorized delegate.
5. Take the Part I Examination of the National Board of Medical Examiners if he is applying for admission to the third year. He should plan to take the examination in June of the year in which he wishes to enter. American citizens attending foreign medical schools are required to pass all subjects of the Part I Examination in order to demonstrate competence in the basic sciences.

The application procedures are otherwise the same as those given under the general instructions for admission.

SELECTION PROCEDURES

The Committee on Admissions reviews credentials as soon as they are complete. The Committee is guided in the selection of students by the applicant's academic ability, the results of the Medical College Admission Test, and personal qualifications as determined by letters of reference and personal interview. Applicants are interviewed regionally or locally on invitation by the Committee. The applicant who is invited to an interview should make every effort to keep the appointment or let the School know promptly if another arrangement must be made. The interviewer's report is an essential part of the applicant's record. The Committee on Admissions will not make a final recommendation until it has been received.

Each applicant is notified of the Committee's decision as soon as possible.

An applicant who is offered a place in a class is required, within two weeks, to notify the Office of Admissions of the School of Medicine of his intent to accept the place reserved for him. A deposit of $100 must be remitted within two weeks of the date of admission. This deposit will not be refunded after March first. It will be credited toward the tuition for the first semester.

Accompanying the offer of a place in class will be forms for a report on physical condition. This report must be completed and returned to the Office of Admissions of the School of Medicine by the student's physician within two months of receipt of the letter of acceptance.

All questions related to admissions, requests for applications, or the mailing of applications and credentials should be addressed to: Office of Admissions, George Washington University School of Medicine, 1331 H Street, N.W., Washington, D.C. 20005.

REGISTRATION

For the fall semester of the academic year 1971–72, registration will be conducted at the University Gymnasium, 2010 H Street, N.W., from 10 a.m. to 4 p.m., September 9. The time and place of registration for the spring semester, and the summer session of fourth-year clerkships, will be announced.

FEES AND FINANCIAL REGULATIONS

The following fees have been established for the academic year 1971–72. (See page 21 for projected tuition increases for 1972–75.)

Application fee	$25.00
Tuition fee, for the academic year:	
First-year students	2,500.00
Other students	2,300.00
University Center fee, charged all students (except those granted "leave of absence" status) each semester	37.50
Late registration fee, for failure to register within the designated period	15.00
Late payment fee, charged for failure to make payments when due (see "Payment of Fees," pages 20–21)	15.00
Financial reinstatement fee, for reinstatement after financial encumbrance for nonpayment of fees (see "Payment of Fees," pages 20–21)	35.00

Continuous Registration fee, charged each student granted "leave of absence" status for each semester in the School of Medicine.....	$74.00
University Center fee, charged each student granted "leave of absence" status, each semester	3.50
Graduation fee	25.00
Returned check fee, charged a student whose check is returned because of insufficient funds or improper drafting.....	15.00

PAYMENT OF FEES

The annual fee of $2,500 for the 1971–72 academic year for first-year students is payable at the rate of $1,250 on or before registration day for each semester. The annual fee of $2,300 for the 1971–72 academic year for all other students is payable at the rate of $1,150 on or before registration day for each semester. Students registered for the summer session of fourth-year clerkships will be on "continuous registration" without charge until the following fall semester. No student is permitted to complete registration or attend classes until all charges are paid. Tuition and fees are payable at the Office of the Cashier of the University. Checks and postal money orders should be made out to The George Washington University.

The Student Accounts Office has responsibility for billing and maintaining student accounts for tuition, various fees, and room and board charges. While tuition is due and payable in full as described above, a student may sign a deferred payment contract with the Student Accounts Office at the time of registration permitting him to pay one-half of the total tuition and fees (except for fees payable in advance) at the time of registration and the remaining half on or before November 3, 1971 (for the fall semester), and March 15, 1972 (for the spring semester). Interest at the rate of eight per cent per annum on the unpaid balance will be charged from the date of registration to the date payment is made. The University will not obligate itself to notify the student, in advance, of the payment-due date for the second half of the semester charge.

Students receiving tuition assistance in the form of scholarships, government tuition contracts, or other forms of tuition awards are not permitted to sign deferred payment contracts unless the total tuition and fee charges exceed the value of the tuition awards by $465 or more. Under such circumstances the student may be permitted to pay one-half of the amount due from the student at the time of registration and to defer the balance by signing a deferred payment contract.

Students who fail to make any payment when due will be automatically charged a $15 late payment fee. Accounts which become 30 days past due will be financially encumbered and will be subject to the interest charge of eight per cent per annum. In the event a student's account is financially encumbered, the student forfeits his rights to the use of the deferred payment contracts in future semesters, and the Student Accounts Office will notify the Registrar to withhold grades, future registration privileges, transcripts, diplomas, and other academic information until the account is settled financially. Financial settlement will require payment in full of all amounts due the University in addition to a financial reinstatement fee of $35.

After a student has entered the course of instruction he is obligated for the tuition for the full semester. A student registered for the clerkships of the

summer session is obligated for tuition due at the time of registration for the following fall semester, except that in the case of withdrawal or leave of absence a *pro rata* payment will become due immediately.

Acceptance by the University of a student's fees does not in any way obligate the School of Medicine to accept the student for any subsequent semester or summer session, and the right is reserved to require the withdrawal of any student whenever, in the interest of the student or the School, the Faculty deems it advisable to do so.

PROJECTED TUITION INCREASES FOR 1972–75

Academic year tuition increases for first-year students have been estimated as follows: 1972–73, $500; 1973–74, no increase; 1974–75, not yet determined. Academic year tuition increases for other students have been estimated as follows: 1972–73, $300; 1973–74, $400; 1974–75, not yet determined. Every effort will be made to keep tuition increases within these limits. However, it is not possible to project future economic data with certainty, and circumstances may require an adjustment in these estimates.

COST OF TEXTBOOKS AND STUDENT EQUIPMENT

The minimum cost of necessary textbooks and student equipment (microscope, drawing materials, glass slides, clinical thermometer, stethoscope, hemocytometer, uniforms, etc.) is approximately as follows: first year, $700; second year, $400; third year, $200; and fourth year, $150. Microscopes must be provided by the student. Rentals are not available.

Because many parents may wish some option in meeting and financing all or part of the cost of a college education, the University offers educational loan plans through the Girard Trust Bank, Philadelphia, Pa.; Funds for Education, Inc., Manchester, N.H.; and The Riggs National Bank, Washington, D.C.

Although similar in purpose, these plans vary somewhat in coverage and conditions. One-year and multiple-year plans are available. Insurance covering the life and health of the sponsor is provided through these plans.

Individuals over twenty-one years of age who are employed full-time are also eligible to apply. They may sponsor their own contracts, provided they meet the conditions specified by the plan for which they are applying.

Brochures and applications describing these plans are available in the Office of Student Financial Aid, George Washington University, Washington, D.C. 20006.

DEGREE REQUIREMENTS

DOCTOR OF MEDICINE

Every candidate for graduation with the degree of Doctor of Medicine must have satisfactorily completed the requirements of the School of Medicine as described under "Plan of Instruction" on pages 12–13, including not less than four academic years of study as a matriculated student in Medicine. He must have completed all required courses and passed satisfactorily all prescribed examinations.

HONORS

A candidate who has completed the four-year medical course and has received the grade of *H* (Honors) in courses totalling 50 per cent or more of the total number of semester hours he has taken may be recommended by the Faculty for graduation "With Distinction."

COMBINED BACHELOR OF ARTS AND DOCTOR OF MEDICINE

In order to be recommended for the degree of Bachelor of Arts, the candidate must complete at least 94 semester hours of prescribed college work (at least 30 hours and one year of residence must be completed in Columbian College of Arts and Sciences) and the first year of the medical curriculum. Upon satisfactory completion of the fourth year of the medical curriculum the student becomes eligible for the degree of Doctor of Medicine.

COMBINED MASTER OF SCIENCE AND DOCTOR OF MEDICINE

Students in the School who wish to apply for the combined degrees of Master of Science and Doctor of Medicine must meet the requirements for admission to the Graduate School of Arts and Sciences. They must be recommended by the chairman of the department and by the deans of the Graduate School of Arts and Sciences and the Medical Center.

The Master of Science program consists of a minimum of 30 semester hours of credit. A maximum of 12 semester hours of credit for graduate-level courses *completed as a part of the Doctor of Medicine degree* (and not already applied toward the Bachelor's degree) will be allowed in fulfillment of the requirements of the Master of Science degree. The remaining 18 semester hours of course work, which includes a thesis, must be in course work in the basic medical sciences normally required for a Master of Science degree in the Graduate School of Arts and Sciences.

DUAL PROGRAM FOR THE DOCTOR OF MEDICINE AND DOCTOR OF PHILOSOPHY DEGREES

A dual program is available to qualified students who seek both the Doctor of Medicine and Doctor of Philosophy degrees. The requirements which must be fulfilled for both degrees are identical to those currently and separately established in the School of Medicine and the Graduate School of Arts and Sciences.

A student working toward these degrees may apply a maximum of 24 semester hours of approved work taken in the School of Medicine toward the total of 72 semester hours required to complete the requirements for the Doctor of Philosophy degree. Twenty-four hours of this requirement must be earned in graduate courses during periods when the student is not obligated to full-time enrollment in the School of Medicine, i.e., during summer sessions, vacation periods, etc. The final 24 semester hours of dissertation research toward the Doctor of Philosophy degree may begin concurrently with the final semester of graduate course work. The estimated expected time for completion of this dual program is 6 years.

In order to enter the dual degree program, a prospective student first must apply for and gain admission to both the Graduate School of Arts and Sciences and the School of Medicine separately through established procedures. Upon

admission to both schools, he may then apply for affiliation with the dual degree program. Work toward the Doctor of Philosophy degree is performed under the jurisdiction of a *departmental* Doctoral Committee.

MASTER OF SCIENCE AND DOCTOR OF PHILOSOPHY REQUIREMENTS

The requirements for the degrees of Master of Science and Doctor of Philosophy are stated in the *Undergraduate and Graduate Catalogue* of the University, which is available at the Graduate School of Arts and Sciences, George Washington University, Washington, D.C. 20006.

FINANCIAL AID

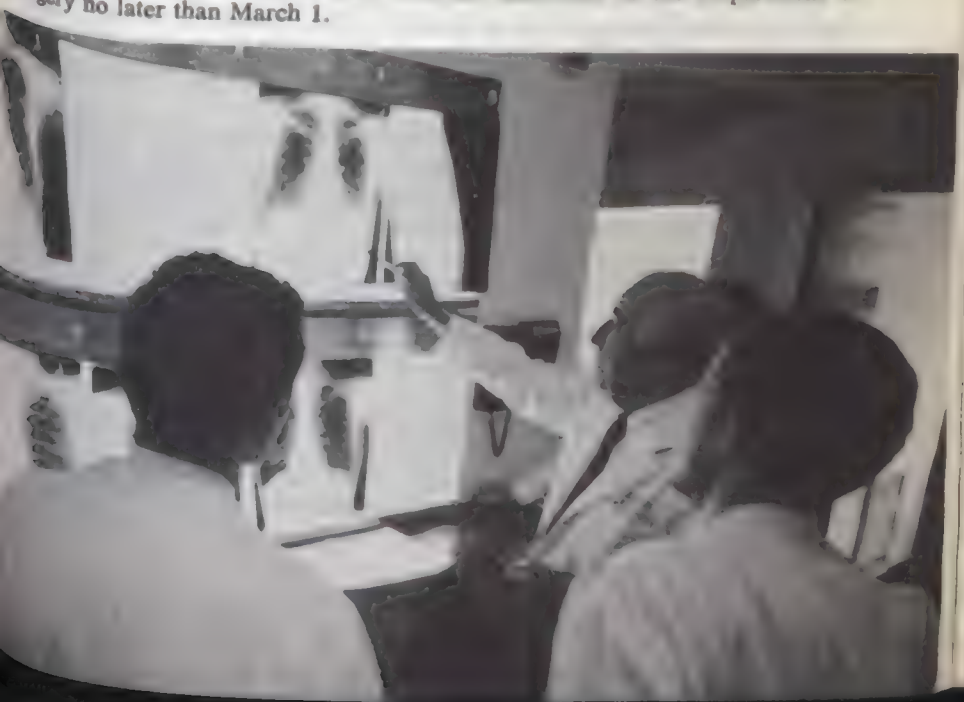
The following fellowships, scholarships, and loan funds are available to students in the School of Medicine. Unless otherwise specified, inquiries should be directed to the Office of the Dean of the Medical Center, George Washington University, 1331 H Street, N.W., Washington, D.C. 20005.

FELLOWSHIPS

Wilbur J. and Edith K. Carr Memorial Fellowship Fund (1965).—By bequest of Edith K. Carr, former Trustee of the University. The income from this fund provides fellowships in surgery, medicine, or medical research at the George Washington University Hospital.

Samuel Jordan Graham Fellowship in Surgery (1961).—By bequest, in memory of Judge and Mrs. Graham. The income from this fund, up to $2,000, may be used to assist students who are pursuing postgraduate study or research, preferably in surgery, at the School of Medicine.

If no individual is conducting such work or deserving of the award, the income may be used to provide one or more scholarships (to cover tuition and other school expenses deemed appropriate) for students in the School of Medicine. Application should be filed with the Chairman of the Department of Surgery no later than March 1.



Robin Miller Research Fellowship (1953).—A $3,000 fellowship established by bequest of Mrs. Robin Miller for the study of cardiovascular diseases.

Henry Rau Foundation Student Fellowship Grant (1967).—Awarded annually to a student in the School of Medicine for research in cancer and allied diseases at the George Washington University Clinic.

U.S. Public Health Service Training Grants.—Information concerning training grants in fields of the medical sciences is available at the Office of the Dean of the Medical Center.

SCHOLARSHIPS

Scholarships awarded to students in the School of Medicine are credited for the academic year unless otherwise specified. Each holder must carry a full schedule of academic work during the period for which the scholarship is awarded. Applicants should apply on prescribed forms which must be filed in the Office of the Associate Dean for Student and Curricular Affairs no later than March 15 preceding the academic year for which the scholarship is to be awarded.

Anna Bartsch Hospital Intern Scholarship (1946).—A partial scholarship established by Dr. Anna Bartsch-Dunne as a memorial to her mother. Awarded to a woman intern in the University Hospital.

Anna Bartsch Medical Student Scholarship (1946).—A partial scholarship established by Dr. Anna Bartsch-Dunne as a memorial to her mother. Awarded to a woman in the School of Medicine "of outstanding scholarship, character, and promise, who intends to make the practice of medicine her life profession."

Jack I. Bender Scholarship (1967).—A partial scholarship established by the family of Jack I. Bender as a memorial to their father. Awarded annually to a student in the School of Medicine on the basis of academic performance and need.

Everett Lamont Bradley Scholarship (1954).—A partial scholarship, by bequest of Alice R. H. Bradley in memory of her son, for a student in the School of Medicine.

Dr. Edith SeVille Coale Scholarships (1965).—Provided at the request of Dr. Coale for women in the School of Medicine. The scholarships are administered by the Zonta Club of Washington. Application should be made to the Office of the Associate Dean for Student and Curricular Affairs no later than December 1.

George Washington University Medical Alumni Scholarships (1965).—One $2,000 scholarship awarded to a student in each of the four classes of the School of Medicine, on the basis of financial need and scholarship.

Health Professions Scholarship Program (1966).—Awarded by the School of Medicine to students who qualify under the provisions of Public Law 89-920. Inquiries should be directed to the Associate Dean for Student and Curricular Affairs.

Joan Luria Hines Scholarship (1968)—Established by friends, students, and faculty of the School of Medicine as a memorial to the wife of a medical student.

Robert Woods Johnson Scholarship Fund.—Available to medical students from New Jersey upon application to the Robert Woods Johnson Foundation.

Ki-Wives of Washington Scholarship Fund (1958).—Two tuition scholarships available to students in the School of Medicine.

Medical Research Scholarships and Traineeships.—For student participation in the research programs of the School of Medicine or special training in research methods. Research scholarships are ordinarily awarded for full-time activity during the summer months; research traineeships support part-time work during the academic year. Scholars are "matched" with members of the faculty in accordance with their mutual interests. Trainees are designated by the departments responsible for the programs. These programs have been sponsored by the National Institutes of Health. In addition a number of research scholarships have been made available through the Washington Heart Association.

Chas. Pfizer Medical Scholarship Program (1962).—Established to financially assist a student in the School of Medicine.

School of Medicine Scholarship Fund (1948).—Established by gifts of various donors for tuition awards in the School of Medicine.

David Perry Steinman Memorial Scholarship Fund (1960).—Established by friends and classmates. Awarded annually to a sophomore in the School of Medicine on the basis of need and academic performance.

James J. Whisman Scholarship (1966).—A partial scholarship by bequest of James J. Whisman for needy and deserving students in the School of Medicine.

COLUMBIAN WOMEN SCHOLARSHIP FUNDS

The Columbian Women Scholarships are awarded to women students on the basis of financial need and scholastic attainment. Candidates must have completed a minimum of 15 hours at this University with a minimum *B* (3.0) average. A letter of application for these scholarships should be addressed to the Chairman, Columbian Women Scholarships, care of the Alumni Office, George Washington University, Washington, D.C. 20006, no later than May 15 for the fall semester, and January 1 for the spring semester. Scholarship aid is awarded from income of the following endowments:

Jessie Fant Evans Scholarship Fund (1967).—A $10,000 fund for tuition aid, established by bequest of Jessie Fant Evans, former Trustee of the University.

Lewes D. and Myrtie H. Wilson Memorial Scholarship Fund (1926).—A fund of $1,000 for tuition aid, established by Elizabeth Wilson as a memorial to her parents.

LOAN FUNDS

American Medical Association Medical Education Loan Guarantee Program (1960).—Available to medical school students (beyond the first semester of medicine).

Edith K. Carr Medical School Loan Fund (1962).—Established by Mrs. Carr for loans to students in the School of Medicine.

Health Professions Student Loan Program.—This fund is available to a full-time student pursuing a course of study leading to the degree of Doctor of Medicine. Interns, residents, students engaged in premedical or other professional training, students enrolled in programs of study other than those leading to the degree mentioned above, are *not* eligible for these loans.

A candidate must (1) be a citizen of the United States or have such immigration status and personal plans as to indicate that he intends to become a permanent resident of the United States, (2) be in need of the amount of the loan

to be able to pursue his course of study, and (3) be in good standing with the School. Inquiries concerning deadlines and applications should be directed to the Associate Dean for Student and Curricular Affairs.

Joseph H. Himes Loan Fund (1956).—Available for loans to students in the School of Medicine.

W. K. Kellogg Medical School Loan Fund (1942).—Established by W. K. Kellogg Foundation in Battle Creek, Michigan, for loans to students in the School of Medicine.

Jessie B. Martin Loan Fund (1967).—Established by friends of Mrs. Jessie B. Martin, former Editor of Academic Publications at the University. An emergency fund for loans up to $250, available to students who are degree candidates.

Pfizer Medical School Loan Fund (1953).—Established by Chas. Pfizer & Co., Inc., for loans to students in the School of Medicine.

School of Medicine Loan Fund (1951).—A fund established and supported by medical school students, available for loans to students in the School of Medicine.

Sutherland Medical School Loan Fund (1941).—Established by Rose I. Sutherland for loans to students in the School of Medicine.

W. E. Wrather Medical Student Loan Fund (1967).—Established by gift of Mrs. Olive D. Wrather in memory of her husband, for loans to students in the School of Medicine.

PRIZES

American Medical Women's Association, Inc., Prize.—A certificate awarded annually to each woman ranking academically in the upper 10 per cent of the graduation class. An additional prize of $100 is awarded to a woman who has the highest scholastic ranking in her graduating class.

Samuel M. and Miriam S. Dodek Prize (1967).—Established in memory of Professor Bernhard Zondek, the eminent discoverer of the endocrinology of the human female reproductive cycle. Awarded annually to a member of the graduating class of the School of Medicine who has attained a commendable knowledge and understanding of the field of female endocrinology.

Allie S. Freed Prize (1957).—Awarded annually to a member of the graduating class in the School of Medicine who has demonstrated exceptional proficiency in the field of preventive medicine.

Walter Freeman Prize (1966).—Awarded annually to a student in the graduating class in the School of Medicine who submits the best essay based on original investigation.

Alec Horwitz Prize (1959).—A prize of $100 awarded annually to a senior who has demonstrated exceptional proficiency in the field of surgery.

Oscar Benwood Hunter Prize (1952).—Established by The George Washington University Medical Society, now known as The George Washington University Medical Alumni Association. Awarded annually to a member of the graduating class of the School of Medicine who has demonstrated outstanding ability in pathology.

Jacobi Medical Society Prize (1962).—Established in memory of Dr. Abraham Jacobi, the founder of pediatrics practice in the United States. Awarded annually to a member of the graduating class of the School of Medicine who has demonstrated outstanding ability in pediatrics.

Howard Kane-A. F. A. King Obstetrical Society Prize (1937).—Established in memory of Dr. Howard Kane and Dr. A. F. A. King, who served as Professors in the School of Medicine. Awarded annually to a member of the graduating class of the School of Medicine who has demonstrated outstanding ability in obstetrics and gynecology.

Lange Medical Publications Prize.—Awarded annually to two members of the graduating class who are considered outstanding by their classmates. The prize consists of the graduate's choice of four books published by Lange Medical Publications.

Huron W. Lawson Prize (1957).—A prize of $100 established by Mrs. Lawson in memory of her husband, who was a distinguished member of the Medical Staff of the University, presented annually to a member of the graduating class who has demonstrated exceptional proficiency in the field of obstetrics and gynecology.

Benjamin Manchester Prize (1966).—Established by a grateful patient in honor of Doctor Benjamin Manchester, Clinical Professor of Medicine. Awarded annually to a member of the graduating class in the School of Medicine who has an outstanding record and shows promise of real humanitarianism in the practice of medicine.

C.V. Mosby Book Prize.—Awarded annually to four members of the graduating class who are considered outstanding by their classmates. The prize consists of the graduate's choice of a book published by C.V. Mosby Company.

Julius S. Neviaser Prize in Orthopaedic Surgery (1956).—A prize of $100 awarded annually to the senior in the School of Medicine who scores the highest grade in a written examination and clinical aspects of orthopaedic surgery.

John Ordronaux Prize (1907).—By bequest, $150 awarded annually to the member of the graduating class of the School of Medicine who has the highest scholastic standing.

Phi Delta Epsilon Prize (1965).—Awarded annually to a student in the School of Medicine for scholarship, leadership, and service, and who is a member of Phi Delta Epsilon.

Roche Prize.—An Omega watch and a scroll awarded annually to the member of the graduating class who best exemplifies the ideals of the modern American physician. The winner is chosen by vote of the graduating class.

William G. Schaffhirt Prize (1966).—By bequest, $200 awarded annually to the senior student in the School of Medicine for the best original essay or thesis on some medical subject of current public interest.

Upjohn Achievement Prize.—A prize of $200 and an inscribed plaque awarded annually to a member of the graduating class selected by his or her classmates on the basis of outstanding scholastic and personal achievement.

REGULATIONS

TTENDANCE

student is not permitted to attend classes until registration has been completed and fees due have been paid. Regular attendance is required.

ADES

—Honors; *P*—Pass; *F*—Failure; *I*—Incomplete; *W*—Withdraw.

Those students whose performances in a subject, as determined by the de partment concerned, are of a very high caliber, and who, in addition, hav demonstrated those qualities of intellectual curiosity, integrity, and self-disci pline which clearly set them apart from the majority of the group, may b assigned the grade of *H* (Honors).

The grade of *P* (Pass) will be assigned to all students who meet the mini mum standards of performance in a subject as determined by the departmen concerned, unless they are entitled to the grade of *H* (Honors).

The grade of *F* (Failure) will be assigned when a student fails to meet the minimum standards of performance in a subject as determined by the depart ment concerned. A student receiving the grade of *F* in any subject may no advance to the work of the following year until he has complied with such recommendations of the Committee on Scholarship as are approved by the Executive Faculty.

The grade of *I* (Incomplete) will be assigned when a student fails to com plete all the required work in a course for reasons acceptable to the Associate Dean for Student and Curricular Affairs. A student in the freshman and soph omore years may not proceed into the work of the following year until a grade of *I* has been removed; if not removed, a grade of *I* will be automatically changed to a grade of *F* (Failure) after one year. A student in the junior year and in the clinical clerkships must remove a grade of *I* prior to graduation.

The grade of *W* (Withdraw) will be assigned only when a student is unable to continue in school for reasons acceptable to the Associate Dean for Student and Curricular Affairs (such reasons may *not* include poor scholarship). Such a student may be readmitted, at the discretion of the Associate Dean for Stu dent and Curricular Affairs, within a period of two years, and he may repeat for credit the course or courses in which he had been assigned the grade of *W*.

PROBATION

A student who receives grades of *F* in courses totalling 6 or more semester hours in one semester will be placed on academic probation for the following semester. A student who while on probation who receives a grade of *F* in any course will be continued on probation for the following semester.

ACADEMIC DISMISSAL

A student (1) who exceeds three semesters, consecutive or otherwise, on pro bation; or (2) who receives grades of *F* in courses totalling 14 or more semes ter hours in any academic year; or (3) who receives grades of *F* in courses totalling more than 20 semester hours of work in the School of Medicine; or (4) whose academic achievement is otherwise considered unsatisfactory by the Committee on Scholarship will not be allowed to continue in the School of Medicine.

EXAMINATIONS

Examinations, which may be written, oral, or practical, will be held during and/or at the end of each semester.

All students in the School of Medicine are required to take Part I and Part II of the National Board of Medical Examiners. A student failing to attain a passing average for the Part I examination in June must repeat the examination in September of the same year and will be registered on academic probation for the following semester.

ACADEMIC DISHONESTY

Academic dishonesty on the part of any student will result in a disciplinary grade of *F* for the course involved and also may, upon the recommendation of the Dean's Council, result in his suspension from the University for a stated period, at the end of which time he may petition for readmission. The disciplinary grade of "Failure—Academic Dishonesty" will be recorded for the course involved, and this grade will be employed in the computation of the quality-point index. A student so suspended shall be withdrawn from all other courses except those in which all work has been completed.

GRADUATION

Application for Graduation.—Application for graduation must be filed in the Office of the Dean and the fee must be paid at the time of registration for the last semester of the senior year.

Presence at Graduation.—A candidate is required to be present at the graduation exercises unless written application for graduation *in absentia* is approved by the Dean.

RIGHT TO DISMISS STUDENTS

The right is reserved by the University to dismiss or exclude any student from the University, or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable.

RIGHT TO CHANGE RULES

The University and its various colleges, schools, and divisions reserve the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

RIGHT TO MAKE CHANGES IN PROGRAMS

The right is reserved by the University to make changes in programs without notice whenever circumstances warrant such changes.

RECENTLY ESTABLISHED REGULATIONS

An Appendix (pages 158–59) contains regulations recently approved by the University's Board of Trustees.

UNIVERSITY POLICY ON THE RELEASE OF STUDENT INFORMATION

In general, the policy of the University is one of attempting to keep the student's record confidential and out of the hands of those who would use it for

other than legitimate reasons. At the same time, the policy must be flexible enough not to hinder the student, the University, or the community in their legitimate endeavors.

No information concerning a student will be released except as noted below:

1. Information such as whether or not the student is currently enrolled; dates of attendance; verification of date and place of birth; degrees earned, if any, date, major field or area of concentration, and honors received; home and local addresses and telephone numbers; school, college, or division of enrollment, and class; verification of signature; name and address of parent or guardian.

2. The issuance of formal transcripts of record to recognized institutions of higher learning; the certification of academic achievement to the various recognized professional associations (law, medicine, engineering, education, etc.).

Additional information will be released only on written authorization from the student, or by court order or subpoena. If a subpoena is served, the student whose record is being subpoenaed will be notified and the subpoena will be referred to the University's legal counsel.

Government investigative agencies have no inherent right to access to student files and records. If expressly requested, properly identified representatives from federal, state, or local government agencies may be given the information listed under No. 1 above.

STUDENT HEALTH SERVICES

The Student Health Service is an outpatient clinic designed to assist all registered students with their health needs while attending the University. This service, located at 935 22nd Street, N.W. (in the University Clinic building), assists with health conditions and medical emergencies by advice and treatment, proper referral when necessary, and cooperation with other physicians and medical facilities.

During the academic year, the hours are 9 a.m. to 10 p.m., Monday through Friday, and 9 a.m. to 12 noon on Saturday. The weekday hours during the summer sessions are from 9 a.m. to 9 p.m.; Saturday hours are 9 a.m. to 12 noon. A physician is in attendance during these hours.

For serious illnesses or emergencies that occur when the Student Health Service is closed, students may call the Medical Bureau (223-2200), or go to the Emergency Room of the University Hospital for treatment. Charges for both of these services are solely the responsibility of the student.

Charges for services that are not available through the Student Health Service, such as X-ray and laboratory tests, specialty services, and consultations, etc., must be paid by the student.

The Student Health Service is available only to those students who are currently enrolled in the University. A student who is not currently enrolled, or one who has severed his connection with the University, is ineligible for this service. This service is not available between the last day of examinations for a semester or summer session and the completion of registration for the next semester or summer session.

A student intending to train for an athletic team is required to pass a medical examination. The University is not responsible for injuries received in intercollegiate or intramural games, or in any of the activities of the Department of Physical Education.

HEALTH AND ACCIDENT INSURANCE

In addition to the above service, the Student Health Service has arranged for Health and Accident Insurance, on an elective basis, for full-time students. Arrangements for insurance coverage are the responsibility of the student. The University assists in the subscription process by administering application cards and collecting fees during official registration periods.

A student may subscribe and pay the coverage *only* when he pays his tuition and other fees at registration. For those few students who register late, the subscription will be available during official late registration. *Subscription during late registration will not be available for those students who previously registered and failed to subscribe at that time.*

The fee charged and the coverage provided are effective, with minor variations (see available folder), whether at the University, at home, or elsewhere, on a 6-month basis—September through February for those subscribing for the fall, and March through August for those subscribing for the spring. The fee charged at each official registration period will be the payment required for full coverage for a 6-month period and must be paid in full at the time of subscription.

The policy contract is between the individual student and the insurance carrier and is accepted at any hospital or emergency room that accepts this type of medical coverage. Details of the policy are contained in a folder available at the Student Health Service Office.

PHYSICAL EXAMINATIONS

All first-year students are required to have a comprehensive physical examination prior to admission to the School of Medicine. The students are informed of significant findings and advised regarding such measures as will tend to help them maintain a high standard of health.

In addition medical students benefit from the complete Tuberculosis Case Finding Program which the School maintains. Under this program all students receive tuberculin tests, X-ray examinations, and such special attention from chest specialists as is necessary to reduce to a minimum the dangers from tuberculosis. Students are immunized against those diseases for which proven prophylaxis exists.

RESIDENCE HALLS

Complete information concerning the University's residence halls is available from the Director of Housing, George Washington University, Washington, D.C. 20006.

Information concerning off-campus housing may be obtained at the Office of the Dean of the Medical Center. Reservations for private housing must be made by students.

HONOR SOCIETIES

Alpha Omega Alpha.—National Honor Medical Society. Members of th Junior and Senior classes meeting the qualifications specified by the constitutio of the Society are eligible for election to membership.

William Beaumont Medical Society.—Medical students showing unusual abi ity for medical writing and research are elected by the active members of th society.

Howard Kane-A. F. A. King Obstetrical Society.—The fifteen students in th third- and fourth-year classes who maintain the highest grades in their work i obstetrics are eligible for membership.

Smith-Reed-Russell Society.—Students of the third and fourth years wh have received the grade of *H* (Honors) in courses totalling 40 per cent o more of their total semester hours are eligible for membership.

UNIVERSITY CENTER

The term University Center encompasses a building, an organization, and program. The building is the University's center for community life. It is th physical instrument for implementation of the programs and objectives of th organization.

The organization, composed of students, faculty, administrators, and alumn in the form of a three-board structure, provides an informal education mediu for individual and group activities adapted to the leisure-time interests an needs of the University community. It also provides training for those direct involved in management and programming for the Center.

The primary purpose of the George Washington University Center is th continuing development of a broad cultural, intellectual, social, and recrea tional program. Its secondary purpose is the provision of its various service and facilities to the campus community for the development of community lif

The Center houses a wide range of facilities to serve the needs of the cam pus, including dining rooms and a rathskeller, a bookstore, lounges and stud areas, a theater, bowling lanes and a billiard room, a University Club, stude organization offices and workrooms, meeting and conference rooms, an info mation center, music listening rooms, social areas, shower and dressing room lockers, and parking accommodations.

RECREATION

The Nation's capital provides abundant recreational resources, a large numbe of which are available at little or no cost. There are numerous art gallerie museums, concert halls, theaters, swimming pools, parks, and places of gre historic interest. Social activities are provided by student organizations of th University, the School of Medicine, and University-sponsored programs suc as intramural sports, concerts, recitals, and dramatic productions. Religious faiths are represented in Washington by one or more churches. Washington one of the most colorful cultural and scientific centers of the world.

The University Hospital and Clinic

THE MEDICAL STAFF CONSISTS of the following groups: Emeritus, Honorary, University, and Courtesy.

Physicians on the Faculty and Staff of Instruction of the School of Medicine are eligible for appointments to the University Hospital Staff. The Administrator of the Hospital and Clinic and the Director of Nursing are ex officio members.

OFFICE OF THE ASSOCIATE DEAN FOR CLINICAL AFFAIRS

I.J. Feffer, B.A., M.D., *Associate Dean*
R.P. Kaufman, B.S., M.D., *Medical Director, University Hospital*
C.T. Klopp, B.A., M.D., *Medical Director, University Clinic*
A.E. Parrish, M.D., *Director of Clinical Research*
Bertel Nelson, B.A., M.D., *Secretary of the Medical Staff, University Hospital*

DEPARTMENTS AND DIVISIONS

Department of Anesthesiology: C.S. Coakley, M.D., *Chairman;* B.S. Epstein, B.A., M.D., *Associate Chairman*
Department of Clinical Engineering: C.A. Caceres, B.S., M.D., *Chairman*
Department of Dermatology: R.S. Higdon, B.S., M.D., *Chairman*
Department of Medicine: W.N. Jensen, B.A., M.D., *Chairman;* G.A. Kelser, Jr., B.S., M.D., *Associate Chairman*
Division of Allergy: Halla Brown, M.D., *Director*
Division of Cardiology: G.A. Kelser, Jr., B.S., M.D., *Director*
Division of Gastroenterology: W.O. Dobbins III, M.D., *Director*
Division of General Medicine: T.E. Piemme, B.S., M.D., *Director*
Division of Hematology: L.S. Lessin, M.D., *Director*
Division of Infectious Diseases: ———
Division of Internal Medicine: Mary Watt, M.D., *Director*
Division of Metabolic and Endocrine Diseases: L.K. Alpert, B.S., M.D., *Director*
Division of Pulmonary Diseases: D.J. Massaro, B.A., M.D., *Director*
Division of Rehabilitation Medicine: J.P. Naughton, B.S., M.D., *Director*
Division of Renal Diseases: A.E. Parrish, M.D., *Director*
Division of Rheumatology: ———
Department of Neurology: Sean O'Reilly, M.B., M.D., *Chairman*
Electroencephalographic Laboratory: Harold Stevens, Ph.D., M.D., *Director*
Department of Neurological Surgery: H.V. Rizzoli, M.D., *Acting Chairman*
Department of Obstetrics and Gynecology: J.G. Sites, M.D., *Chairman*
Department of Ophthalmology: M.F. Armaly, M.S., M.D., *Chairman*
Department of Orthopaedic Surgery: J.P. Adams, B.S., M.D., *Chairman;* H.L. Feffer, B.A., M.D., *Associate Chairman*
Department of Pathology and Clinical Pathology: T.M. Peery, B.A., M.D., D.M.S., *Chairman*
Department of Pediatrics: R.H. Parrott, M.D., *Acting Chairman;* A.M. Margileth, B.A., B.S., M.D., *Associate Chairman*
Department of Psychiatry: Leon Yochelson, B.A., M.D., *Chairman*

Department of Radiology: W.W. Stanbro, M.D., *Chairman*
Department of Surgery: P.C. Adkins, B.A., M.D., *Chairman*
Division of General Surgery: P.C. Adkins, B.A., M.D., *Acting Chairman*
Division of Oral Surgery: S.G. Mead, D.D.S., *Director*
Division of Otorhinolaryngology: J.J. McFarland, Jr., B.S., M.D., *Chairma*
Division of Plastic Surgery: G.S. Letterman, B.S., M.D., *Director*
Division of Traumatology: D.S. Wenger, M.S., M.D., *Director*
Department of Urology: F.C. Derrick, Jr., B.S., M.D., *Chairman*

ADMINISTRATIVE STAFF

OFFICE OF THE ADMINISTRATOR

V.F. Ludewig, B.S., *Administrator*
F.A. Menk, *Associate Administrator, University Hospital*
F.P. Ferraraccio, B.S., M.B.A., *Associate Administrator, University Clinic*
K.M. Brent, B.S., M.H.A., *Assistant Administrator, University Hospital*
LeRoy Norem, *Assistant Administrator, University Hospital*
Donald Wise, B.S., *Assistant Administrator, University Hospital*
P.D. Torrence, B.A., M.B.A., *Assistant Administrator, University Clinic*
R.F. Whitehair, *Evening Administrator, University Hospital*
Irene Menassa, R.N., B.S., M.A., *Assistant Administrator; Director of Nursing*
Irma Kraft, R.N., M.A., *Associate Director of Nursing*
Louise O'Neal, R.N., B.A., *Assistant Director of Nursing*
Rainer Volk, *Comptroller, University Hospital*
F.D. Cooper, M.S., *Chief Pharmacist*

GENERAL INFORMATION

The George Washington University Hospital functions as an active teachin facility for students of the School of Medicine and for a large House Staff. It fully approved by the American Medical Association, the American Hospita Association, the American College of Physicians, and the American College Surgeons, through the Joint Commission for the Accreditation of Hospitals. The University Hospital is located on Pennsylvania Avenue at Washingto Circle, six blocks from the White House, near the downtown area of metro politan Washington. Annual admissions of inpatients number approximatel 16,000; visits of ambulatory patients to the University Clinic are approximatel 37,000 a year.

The Eugene Meyer Pavilion is a new and attractive six-floor addition to the University Hospital that is fully functional. In addition to one hundred new beds, the Eugene Meyer Pavilion contains an expanded operating suite specially serviced by modern electronic monitoring devices; an In- and Out-surgic Service which has its own reception accommodations, special operating rooms and recovery area; an entire floor set aside for clinical research activities in cluding a series of superbly equipped special laboratories and eighteen specially designated patient beds; a six-million volt linear accelerator to facilitate radia tion therapy; a well-equipped and very active radioisotope laboratory devoted to a wide variety of diagnostic and therapeutic procedures; specially designe teaching and conference areas which have telephonic-dictating, tape-recording and visual-projection devices available.

Remodeling, updating, and extensive modification of the original Hospital building is now complete. The enlarged and renovated University Hospital is centrally air-conditioned throughout; has a total of 550 beds for inpatient use; and includes a new delivery suite; specially designed and equipped intensive care and coronary care units; enlarged X-ray, pathology, and physical medicine departments; as well as all of the latest diagnostic and supporting facilities. The University Hospital has been designed to make available to patients the highest quality of diagnostic and therapeutic services, as well as to provide a broad spectrum of interrelated teaching and research activities.

The Council on Medical Education of the American Medical Association has approved the University Hospital for straight internship in medicine, pathology, and surgery, and, together with the various specialty boards, for residency training in anesthesiology, cardiac diseases, internal medicine, neurological surgery, obstetrics-gynecology, ophthalmology, orthopaedic surgery, pathology, physical medicine and rehabilitation, plastic surgery, psychiatry, radiology, surgery, thoracic surgery, and urology.

Junior and senior students of the School of Medicine are assigned to the University Hospital and Clinic to serve as clinical clerks in the various specialty departments, in the Emergency Unit, and in different elective programs. Regular conferences for students, house staff, and attending physicians are held.

Other major teaching activities include a residency program in hospital administration; close affiliation with the University's graduate program in hospital administration; programs in medical technology leading to the degree of Bachelor of Science in Medical Technology as well as to a certificate; and an affiliation for the training of practical nurses.

The Hospital has an excellent branch medical library. The House Staff can also arrange to use libraries of the School of Medicine and the University and outstanding city and federal libraries and record collections.

INTERNSHIP, RESIDENCY, AND FELLOWSHIP PROGRAMS

Internships.—Straight internships are available in medicine, pathology, and surgery.

Residencies.—Approved residencies are offered for a total of 138 positions, in the fields of anesthesiology, cardiac diseases, internal medicine and most of the subspecialties, neurological surgery, obstetrics-gynecology, ophthalmology, orthopaedic surgery, pathology, physical medicine and rehabilitation, plastic surgery, psychiatry, roentgenology, surgery, thoracic surgery, and urology. Residency programs are from one to four years in duration, depending upon the service. Residents and fellows in the University Hospital programs also receive appointments as members of the faculty of the School of Medicine with active teaching responsibilities.

Fellowships.—Fellowships, through the School of Medicine, of one or two years are available in allergy, anesthesiology, cardiology, chest diseases, gastroenterology, hematology, infectious diseases, metabolic diseases, oncology, pediatrics, physical medicine and rehabilitation, renal diseases, rheumatic diseases, surgery, thoracic surgery, and University Clinic.

All appointments are for one year with the privilege of applying for continuation on the House Staff. In several of the intern, residency, and fellowship

programs, excellent affiliations are maintained with local and governmental hospitals. Inquiries and applications for internships and residencies should be addressed to the Chairman of the Department or to the Associate Dean for Clinical Affairs of the Medical Center, George Washington University Hospital, 901 23d Street, N.W., Washington, D.C. 20037.

Information relative to fellowships may be obtained from the Chief of the Department concerned or from the Associate Dean of the Medical Center for Clinical Affairs, in care of the Hospital.

MEDICAL TECHNOLOGY COURSE

This course is open to candidates for the degree of Bachelor of Science in Medical Technology, offered by Columbian College of Arts and Sciences, and to the other applicants meeting the requirements of the Registry of Medical Technologists of the American Society of Clinical Pathologists. These requirements, fully satisfied by the Columbian College program, consist of 3 years (90 semester or 135 quarter hours) of college work in any college or university approved by the recognized regional accrediting agency, including certain specific courses in the science field. The specific science requirements are as follows: *Chemistry*—a minimum of 4 semesters or 6 quarters (16 semester hours or 24 quarter hours) of studies acceptable toward a major in chemistry and including lecture and laboratory; *Biological Sciences*—a minimum of 4 semesters or 6 quarters (16 semester hours or 24 quarter hours) of studies acceptable toward a major in biological science and including lecture and laboratory; *Mathematics*—a minimum of 3 semester hours or 4 quarter hours of college mathematics.

For students enrolled in Columbian College of Arts and Sciences as candidates for the degree of Bachelor of Science in Medical Technology, the Medical Technology Course constitutes the final (fourth) year of qualification for the degree.

In the case of those who have taken their prerequisite work in some other college or university, satisfactory completion of the Medical Technology Course will not satisfy the requirements for the degree from Columbian College.

The Medical Technology Course consists of 12 months of didactic and practical work in clinical laboratory procedures, offered by the Department of Pathology in the University Hospital. Students ordinarily begin this course with the fall semester, but under exceptional circumstances may begin at other times.

A limited number of scholarships are provided by the University Hospital for students enrolled in the fourth year of the degree program. All students in this fourth year must provide themselves with uniforms; laundry of uniforms is provided by the University Hospital.

Upon satisfactory completion of the course a certificate is awarded, and the candidate is eligible for the national certifying examination given by the Registry of Medical Technologists.

Enrollment in the Medical Technology Course is strictly limited so that personal instruction can be given. Acceptance to the Columbian College degree program does not necessarily assure acceptance into the Hospital program. Inquiry about this course should be sent directly to the Department of Pathology, George Washington University Hospital, Washington, D.C. 20037.

THE GENERAL ALUMNI ASSOCIATION

THE OBJECTIVES OF THIS ASSOCIATION are to unite graduates who wish to associate themselves for charitable, educational, literary, and scientific purposes, and to promote the general welfare of the University.

Eligible members are those who have matriculated in any school of the University and left the University in good standing, or any person who is or has been a member of the teaching, research, or administrative staff of the University, or of the Board of Trustees of the University. Active members are those eligible members who are current contributors (dues or otherwise) to or life members of the George Washington University General Alumni Association, the Alumni Association of any school of the University, or contributors to the Annual Support Program.

The Alumni Office is in Bacon Hall, 2000 H Street, N.W., Washington, D.C. 20006. All alumni are urged to keep the Alumni Office informed of changes of address or occupation and to supply information with regard to their fellow alumni.

THE GEORGE WASHINGTON UNIVERSITY MEDICAL ALUMNI ASSOCIATION

The George Washington University Medical Alumni Association, incorporated in 1959, continues the organization previously known as the George Washington University Medical Society.

The stated purposes of the Association are as follows: "This shall be a nonprofit organization international in scope, whose objectives shall be to provide constructive services for the alumni of the George Washington University School of Medicine, for furthering the art and science of medicine, research, and for the promotion of the welfare of the George Washington University School of Medicine, its students, the George Washington University Hospital and its trainees."

Active membership in the Association consists of all graduates of the School of Medicine; current members and, on application, past members of the teaching staff of the School of Medicine who hold doctoral degrees; Doctors of Medicine who have had one or more years of postgraduate training in the George Washington University Hospital. Junior membership consists of all members of the student body of the School of Medicine during the time they are students.

The Medical Alumni Association maintains an office in the School of Medicine at 1331 H Street, N.W., Washington, D.C.

OFFICERS FOR 1970–71

President—Jerome W. Canter, M.D. 1955; 2141 K Street, N.W., #509, Washington, D.C. 20037

President Elect—Marvin P. Footer, B.A. 1938, M.D. 1942; 908 New Hampshire Avenue, N.W., Washington, D.C. 20037

Regional Vice President—Tobias R. Funt, M.D. 1950; 1601 East Broward Boulevard, Fort Lauderdale, Fla. 33301

Regional Vice President—Howard G. McQuarrie, M.D. 1955; 508 East South Temple, Salt Lake City, Utah 84102
Secretary—John F. Mermel, M.D. 1960; 2141 K Street, N.W., Washington, D.C. 20037
Treasurer—Donald H. Glew, M.D. 1948; 4830 V Street, N.W.; Washington, D.C. 20007
Councilmen:
Jerome H. Epstein, B.A. 1948, M.D. 1953; 2141 K Street, N.W., Washington, D.C. 20037
Maurice T. Gromet, B.A. 1931, M.D. 1934; 130 Lincoln Road, Brooklyn, N.Y. 11225
Richard I. Kilstein, B.A. 1931, M.D. 1934; 16 East 72nd Street, New York, N.Y. 10028
Jack B. Kleh, B.A. 1942, M.D. 1944; 915 19th Street, N.W., Washington, D.C. 20006
Angelo May, M.D. 1937; 450 Sutter Avenue, San Francisco, Calif. 94108
Carolyn Pincock, B.A. 1931, M.D. 1934; 1944 Seminary Road, Silver Spring, Md. 20910
Morris Rosenberg, B.A. 1938, M.D. 1941; 2141 K Street, N.W., Washington, D.C. 20037
Carlos Silva, M.D. 1960; 1631 16th Street, N.W., Washington, D.C. 20006
George Speck, M.D. 1941; 4801 Kenmore Avenue, Alexandria, Va. 22304
Allan Zellis, M.D. 1941; 2400 Virginia Avenue, N.W., Washington, D.C. 20037





COURSES OF INSTRUCTION

ON THE FOLLOWING PAGES OF THIS CATALOGUE are listed the courses of instruction offered by the School of Medicine. The School of Medicine serves other divisions of the University by making available to nonmedical students certain undergraduate and graduate courses in the following departments: Anatomy, Biochemistry, Epidemiology and Environmental Health, Microbiology, Pathology, Pharmacology, and Physiology. The courses listed are subject to some slight change. The University reserves the right to withdraw any course announced.

STAFF OF INSTRUCTION

The Staff of Instruction listed under each Department is for the academic year 1970–71.

EXPLANATION OF COURSE NUMBERS AND SYMBOLS

A number in parentheses after the name of the course indicates number of semester hours of credit which may be earned.

Courses numbered from 101 to 200 are for third- and fourth-year Columbian College of Arts and Sciences students.

Courses in the basic science departments are numbered from 201 to 400. They are for medical students and graduate students in the Arts and Sciences.

Courses in the clinical departments are numbered from 301 to 400. They are limited to medical students.

REGISTRATION FOR CAREER ELECTIVES 1971–72

At registration for the fall semester on September 9, 1971, students will register for the first two periods of electives—December 6, 1971, through January 2, 1972; and January 3 through January 30, 1972. At registration for the spring semester in January, 1972, students will register for the four remaining elective periods—January 31 through February 27; February 28 through March 26; March 27 through April 23; and April 24 through May 21, 1972. Special arrangements for registration in January will be made for students who are away on electives.

KEY TO ABBREVIATIONS

The following abbreviations are used in this catalogue for course designations and by students in registering for classes.

Anat	Anatomy	**Orth**	Orthopaedic Surgery
Anes	Anesthesiology	**Ob&G**	Obstetrics and Gynecology
Bioc	Biochemistry	**Opth**	Ophthalmology
Chem	Chemistry	**Otol**	Otolaryngology
ClEn	Clinical Engineering	**Path**	Pathology
Derm	Dermatology	**Ped**	Pediatrics
Epid	Epidemiology and Environmental Health	**Phar**	Pharmacology
		Phys	Physics
Math	Mathematics	**Phyl**	Physiology
M&PA	Medical and Public Affairs	**Pchi**	Psychiatry
Med	Medicine	**Rad**	Radiology
Micr	Microbiology	**Surg**	Surgery
N Su	Neurological Surgery	**Urol**	Urology
Neur	Neurology		

Anatomy

Professors I.R. Telford *(Chairman)*, Paul Calabrisi, C.M. Goss *(Visiting—Medical History)*, F.D. Allan, T.N. Johnson
Professorial Lecturers J.L. Angel, T.S. Reese
Associate Professor J.B. Christensen
Associate Clinical Professor R.N. Brown
Associate Professorial Lecturers J.A. Di Paolo, L.E. Church, Joan Blanchette-Mackie
Assistant Professors E.N. Albert, Marilyn Koering
Assistant Professorial Lecturer R.G. Clark
Instructor R.E. Perkins

*201 **Anatomy** (12) — **Staff**

All anatomical disciplines are integrated: regional gross dissection, histology, neuroanatomy, embryology. (Fall)

202 **Gross Anatomy** (6) — **Calabrisi and Staff**

For graduate students. Regional dissections of adult cadaver supplemented with lectures and X-rays. Laboratory fee, $30. (Fall)

203 **Human Embryology** (1) — **Allan**

For graduate students. Origin and development of human body; emphasis on value of embryology in interpreting anatomical anomalies. (Fall)

204 **Neuroanatomy** (2) — **Johnson and Staff**

For graduate students. Gross and microscopic anatomy of central nervous system and special senses. Laboratory fee, $13. (Fall)

* Required for medical students.

205 **Microscopic Anatomy** (3) — Telford and Staff

For graduate students. Microscopic structure of cells, tissues, and organs of the human body. Laboratory fee, $13. (Fall)

221–22 **Seminar** (1–1) — Johnson and Staff

For graduate students. Research reports and discussions of special topics by staff and graduate students. Medical students encouraged to attend. (Academic year)

249 **Introduction to Anatomical Research** (1) — Telford and Staff

For graduate students. Major research techniques as applied to biological materials in the various anatomical disciplines. (Fall)

252 **Physical Anthropology** (1) — Angel

Variations in man and factors affecting him, human evolution and racial differences, anatomy and culture of ancient man. (Spring)

254 **Fetal Anatomy** (2) — Allan

Dissection of early and late human fetus. Comparision of fetal and adult structures. 20 students. Laboratory fee for nonmedical students, $10. (Spring)

256 **Human Genetics** (1) — C.B. Jacobson

General principles of genetics, new cytogenetics technics, aneuploidy in man and its significance, biochemical aspects of heredity, genetic counseling. (Spring)

258 **Cytology** (3) — Albert and Staff

For graduate students. Detailed study of morphology and function of the cell and its organelles. Basic cytological techniques emphasized. Laboratory fee for nonmedical students, $20. (Spring)

260 **Electron Microscopy in Cellular Biology—Lecture** (1) — Blanchette-Mackie

Anat 260 may be taken without 261. (Spring)

261 **Electron Microscopy in Cellular Biology—Laboratory** (2) — Blanchette-Mackie

Prerequisite or concurrent registration: Anat 260. 12 students. Laboratory fee for nonmedical students, $15. (Spring)

262 **Gross Anatomy of Upper and Lower Extremities** (2) — Calabrisi

Detailed dissection, supplemented by X-ray anatomy; discussions, assigned reading. 24 students. Laboratory fee for nonmedical students, $10. (Spring)

264 **Gross Anatomy of Head and Neck** (2) — Christensen

Detailed dissection, supplemented by X-ray anatomy; discussions, assigned reading. 24 students. Laboratory fee for nonmedical students, $10. (Spring)

266 **Gross Anatomy of Thorax and Abdomen** (2) — Christensen

Detailed dissection, supplemented by X-ray anatomy; discussions, assigned reading. 24 students. Laboratory fee for nonmedical students, $10. (Spring)

268 **Gross Anatomy of Pelvis, Perineum, and Lower Extremity** (2) — Calabrisi

Detailed dissection, supplemented by X-ray anatomy; discussions, assigned reading. 24 students. Laboratory fee for nonmedical students, $10. (Spring)

270 **Dissection of the Human Brain** (1) — Johnson

Dissection of major pathways and nuclei of the brain with consideration of ventricular system; conferences and assigned reading. 20 students. Laboratory fee for nonmedical students, $10. (Spring)

272 **Autonomic Nervous System** (1) — Allan

Development, microscopic and gross anatomy, function of central and peripheral components of autonomic nervous system. (Spring)

274 **Tissues of the Body** (1) — Telford

Basic concepts in anatomy, with emphasis on primary tissues of the body—their histogenesis, growth, functions, regenerative capacities, aging, death. (Spring)

276 **Advanced Studies in Anatomy** (1) — Telford and Staff

For graduate students. Lectures and conferences on selected anatomical subspecialities—endocrinology, teratology, growth, etc. May be repeated for credit. (Spring)

278 **History of Anatomy and Surgery** (1) — Goss

Lectures and discussions related particularly to the lives and times of outstanding contributors to the advancement of the science of anatomy and surgery. (Spring)

279 **Regional Anatomy** (5) — Christensen

Advanced dissection of abdomen, thorax, or head and neck. 4 seniors; 4-week elective periods. School of Medicine (December–May)

280 **Regional Anatomy** (5) — Calabrisi

Advanced dissection of upper and lower extremities, or lower extremities and pelvis. 4 seniors; 4-week elective periods. School of Medicine (January 31–March 26)

281 **Neonatal Anatomy** (5) — Allan

Detailed dissection of newborn or late fetus. 4 seniors; 4-week elective periods. School of Medicine (January 31–March 26)

282 **Advanced Neuroanatomy** (5) — Johnson

Detailed dissection of human adult brain. 5 seniors; 4-week elective period. School of Medicine (January 31–February 27)

283 **Introduction to Neuroanatomical Research** (5) — Johnson

Techniques and principles of research in neuroanatomy. 5 seniors; 4-week elective period. School of Medicine (January 31–February 27)

284 **Experimental Teratology** (10) — Telford

Congenital abnormalities in animals induced by various experimental methods. 2 seniors; 8-week elective periods. School of Medicine (December–May)

286 **Microangiography and Microradiography** (5) Christensen
Intimate vasculature of selected organs by injection and radiography 2 seniors; 4-week elective periods. School of Medicine (December–May)

287 **Human Cytogenetics** (5) C.B. Jacobson
Chromosomal research on reproductive anomalies, congenital malformations, mutagenic assay. Tissue culture, photomicrography, karyotypic analysis, genetic counseling. 2 seniors; 4-week elective periods. Univ. Hosp. (December–May)

295 **Research** (arr.) Staff
Content differs each time course is offered; may be repeated once for credit. Fee to be arranged. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Anesthesiology

Professors C.S. Coakley *(Chairman)*, Seymour Alpert, B.S. Epstein *(Associate Chairman)*
Clinical Professor D.H. Stubbs
Associate Professors Paula Kaiser, Patricia Russell, Marie-Louise Kennedy, Arthur Peschin, G.A. Morales
Assistant Professors H.L. Rudman, C.H. Klingenmaier, Hildegard Manitsas
Assistant Clinical Professors S.N. Albert, W.E. Bageant, E.J. Dealy, C.E. Fierst, K.J. Hassan, Chalom Albert
Instructors Mary Salto, J.B. Craft, Jr., J.I. Auñón *(Research)*

*301 **Anesthesiology** (1) Staff
Fundamentals of anesthesia reviewed and correlated with other medical specialties. (Spring)

*302 **Clinical Clerkship** (5) Staff
Clinical preoperative evaluation, surgical and obstetrical anesthesia, infant and adult resuscitation, inhalation therapy, management of patients in coma, shock, and other problems which may be encountered in medical practice. 1 week—Univ. Hosp., 1 week—Wash. Hosp. Center (2-week periods throughout academic year)

* Required for medical students.

380 **Anesthesiology** (5) **Coakley**

Clinical preoperative evaluation, surgical and obstetrical anesthesia, infant and adult resuscitation, inhalation therapy. 2 seniors; 4-week elective periods. Univ. Hosp. (December–May)

381 **Anesthesiology** (5)

Clinical preoperative evaluation, surgical and obstetrical anesthesia, infant and adult resuscitation; inhalation therapy; blood volume determinations. 2 seniors; 4-week elective periods. Wash. Hosp. Center (December–May)

383 **Pediatric Anesthesia** (5) **Hassan**

Clinical preoperative evaluation, pediatric anesthesia, infant resuscitation. 2 seniors; 4-week elective periods. Children's Hosp. (December–May)

384 **Special Care Unit** (5) **Rudman**

Evaluation and management of respiratory failure, rationale and use of automatic ventilators, chronic airway management, cardiovascular support, and intensive care. 1 senior; 4-week elective periods. Univ. Hosp. (December–May)

385 **Automated Patient Monitoring** (5) **Russell**

Automated patient monitoring techniques, introduction to programming of physiologic data for the management of critically ill patients. 2 seniors; 4-week elective periods. Warwick Bldg. (December–May)

Biochemistry

Professors C.R. Treadwell *(Chairman)*, B.W. Smith, G.V. Vahouny, J.M. Bailey

Professorial Lecturers W.W. Burr, Jr. *(Isotopes)*, R.W. Albers *(Brain)*, Roscoe Brady, Jr. *(Brain)*, Arnold Schaefer, Edward Steers, Jr., W.F. Anderson *(Genetics)*, H.L. Ozer, Gordon Guroff, Martin Flavin, A.N. Schechter

Assistant Professors Glenn Walker, Linda Gallo *(Research)*, Barbara Howard *(Research)*

Lecturer P.H. Fishman

Special Lecturers Walter Mertz *(Inorganic Metabolism)*, J.C. Smith, Jr.

*201 **Medical Biochemistry** (8) **Staff**

Lectures and laboratory; emphasis on basic principles and their relation to medicine. (Fall)

221–22 **General Biochemistry** (4–4) **Vahouny**

For graduate students. Lectures and laboratory. Prerequisite: Chem 52, 54. Material fee, $20 a semester. (Academic year)

224 **Biochemistry of Enzymes** (1)

Biochemistry of enzymes and enzyme reactions. Prerequisite: Bioc 201 or 221. (Spring)

*Required for medical students.

225 **Biochemical Procedures** (3) B. Smith and Staff

Laboratory course. Material fee for nonmedical students, $16. Content differs each time course is offered; may be repeated for credit. (Fall and spring)

227 **Biochemistry Seminar** (1) Staff

Current literature in biochemistry, mainly for graduate students, but open to limited number of specially qualified medical students. Content differs each time course is offered; may be repeated for credit. (Fall and spring)

232 **Proteins and Amino Acids** (1) Steers

Prerequisite: Bioc 221. (Spring)

241 **Isotopes** (3) Burr

Theoretical characterization of isotopes and their applications in biology and medicine. Attention given to counting, health physics and radiation safety, autoradiography, chromatography. Laboratory fee for nonmedical students, $16. (Spring)

251 **Carbohydrate Metabolism** (1)

Prerequisite: Bioc 201 or 222. (1971–72 and alternate years: spring)

252 **Biochemistry of the Brain** (1) Albers, Brady

For medical students; open to limited number of graduate students. Recent biochemical developments in structure, functions, and metabolic processes unique to the brain. (Spring)

254 **Human Nutrition** (1)

For medical students; open to limited number of graduate students. Application of nutritional principles in humans. (Spring)

256 **Biochemistry of Organ Function** (1) Kramer

For medical students; open to limited number of graduate students. Emphasis on biochemical processes unique to particular organ systems; application of these processes to evaluation of function. (Spring)

258 **Inherited Metabolic Diseases** (1) Ozer

For medical students; open to limited number of graduate students. Contribution of molecular biology to understanding of human mutations and hereditary diseases. Specific disease states and genetics of protein structure discussed. Prerequisite: Bioc 222. (Spring)

260 **Biochemistry of the Steroids** (1) O. Dodek

For medical students; open to limited number of graduate students. Basic chemistry of the steroids, pathways of biosynthesis and metabolism, regulatory mechanisms, physiologic effects, clinical measurement of endogenous steroids, clinical manifestations of steroid imbalance, steroid changes in pregnancy, and steroid therapy. (Spring)

262 **Biochemistry of the Lipids** (1) Vahouny

For graduate students; open to maximum of 15 medical students. 1971–72 and alternate years: chemistry, properties, occurrence of important classes of biological lipids. 1972–73 and alternate years: metabolism of lipids, including digestion, energy production, biosynthesis, function in specialized

tissues and subcellular structures. Content differs each time course is offered; may be repeated for credit. (Spring)

266 **Biochemical Genetics** (1) — Anderson

For medical students; open to limited number of graduate students. (Spring)

279 **Research in Renal Function, Mutarotase, and Sugar Transport** (10) — Bailey

Clinical significance of plasma mutarotase levels in kidney disease. 2 seniors; 8-week elective periods. School of Medicine (December–May)

280 **Research in Experimental Atherosclerosis** (10) — Bailey

Study of factors influencing the development and course of atherosclerosis in rabbits. 2 seniors; 8-week elective periods. School of Medicine (December–May)

281 **Research in Biochemistry of Carbohydrates and Enzymes** (10) — B. Smith

Research in a problem already under investigation in the Department or a project in related fields suggested by the student. 2 seniors; 8-week elective periods. School of Medicine (December–May)

282 **Research in Biochemistry of Lipid Metabolism and Transport** (10) — Vahouny

Biochemical investigation of a clinical problem involving lipids of special interest to the student, or participation in existing research program in the Department. 2 seniors; 8-week elective periods. School of Medicine (December–May)

283 **Research in Metabolic Regulation within the Heart** (10) — Vahouny

Studies on metabolic regulation and effect of drugs. 2 seniors; 8-week elective periods. School of Medicine (December–May)

286 **Research on Transfer RNA and Protein Biosynthesis in Normal and Tumor Cells** (10) — R.C. Gallo*

Investigative work on isolation and purification of RNA fractions and function in protein synthesis. 2 seniors; 8-week elective periods. National Cancer Institute (December–May)

287 **Research in Biochemistry of B_{12} Coenzymes** (10) — Walker

Research in a problem already under investigation in the Department. 2 seniors; 8-week elective periods. School of Medicine (December–May)

295 **Research in Biochemistry** (arr.) — Staff

For freshman and sophomore medical students and graduate students. Participation in a project under investigation in the Department or one in a related field suggested by the student and approved by the Staff. Content differs each time course is offered; may be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) — Staff

(Fall and spring)

* Dr. Gallo is Senior Investigator at the National Cancer Institute.

398 **Advanced Reading and Research** (arr.) **Staff**

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) **Staff**

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Clinical Engineering

Professor C.A. Caceres *(Chairman)*
Associate Professors W.R. Ayers, J.C. Aller
Associate Professorial Lecturer G.B. Devey
Assistant Professors J.R. Landoll, D.E. Winer, Anna Weihrer
Assistant Clinical Professor H.A. Haessler
Instructors David Lee, Sidney Abraham, G.S. Lang, D.B. Murray *(Research)*, K.D. Williams

351 **Medical Engineering for Medical Students** (10) Fowler, Eisenberg*

Medical and engineering students will be paired whenever possible to provide a mutual introduction to the principles and practices of each discipline. Instruction will be provided through seminar and lecture periods and participation in current laboratory projects. Consultation with instructor required prior to enrollment. 2 seniors; 8-week elective periods. Univ. Clinic (December–May)

353 **Electronics and Computers** (10) Caceres

Research in one of the following areas—computer analysis of arrhythmias, correlation of ECG with autopsy data, ECG variability, ECG during exercise, instrumentation in blood pressure recording, computer analysis of pulmonary function tests, plethysmograph, phonocardiography, statistical analysis of ECG data, automatic identification of bacteria, computer analysis of electrophoretic curves. 2 seniors; 8-week elective periods. Warwick Bldg. (December–May)

354 **Automated Medical Measurement Systems** (10) Caceres and Staff

Students work with a multidisciplinary group in the application of automated techniques to real-life problems in clinical medicine. Participation in the design, implementation, and evaluation of multiphasic and ill-patient monitoring system. 2 seniors; 8-week elective periods. Warwick Bldg. (December–May)

Dermatology

Professor R.S. Higdon *(Chairman)*
Clinical Professor J.Q. Gant, Jr.
Associate Clinical Professor W.M. Narva

* Dr. Eisenberg is Associate Professor of Engineering and Applied Science in the School of Engineering and Applied Science.

Assistant Professor Mervyn Elgart
Assistant Clinical Professors C.S. Brown, Manuel Landman, P.L. Repetto, Jr., Donald Mitchell, L.J. Eanet, W.R. Vineyard
Clinical Instructors Phylis Huene, H.S. Golomb, Maria Turner, Ronald Goldner
Special Lecturer Gerda Landman

380 **Dermatology Clinic** (5)

Conferences, lectures, and attendance at Dermatology Clinic where patients with wide variety of dermatoses are seen. To acquaint student with diagnosis and treatment of common skin disorders. Dermatologic surgical procedures, technique for using liquid nitrogen, culture and identification of fungi, microscopic diagnosis of common cutaneous diseases. 2 seniors; 4-week elective periods. Walter Reed Gen. Hosp. (December–May)

381 **Dermatology Clinic** (5) Goldner

Same as Derm 380. 1 senior; 4-week elective periods. Andrews Air Force Base Hosp. (December–May)

382 **Dermatology Clinic** (5) Higdon

Same as Derm 380. 1 senior; 4-week elective periods. Univ. Clinic (December–May)

383 **Dermatology Clinic** (5) Narva

Same as Derm 380. 1 senior; 4-week elective periods. Nat'l Naval Medical Center (December–May)

384 **Private Office Practice** (5) Brown

1 senior; 4-week elective periods. (December–May)

385 **Private Office Practice** (5) Eanet

1 senior; 4-week elective periods. (December–May)

Epidemiology and Environmental Health

Professors J.W. Millar *(Chairman)*, J.A. Halsted *(International Health)*
Associate Professor C.R. Hartman
Associate Clinical Professors David Frost, W.J. Zukel, L.S. Jaffe
Assistant Professors E.N. Kassira, Yousef Al-Doory, F.L. Hurley
Assistant Clinical Professors Lawrence Pyle, Jr., John Vinyard, Jr.
Assistant Professorial Lecturers S.H. Barboo, Jr., C.H. Miller, N.E. Manos, J.A. Lee

*201 **Introduction to Epidemiology and Environmental Health** (2) Millar and Staff

For medical students; open to qualified graduate students. Principles and methodology of epidemiology and biostatistics. Ecological approach to health and disease, including parasitology and mycology. (Spring)

* Required for medical students.

217 Advanced Mycology (2) — Al-Doory

Advanced study of fungi. Prerequisite: Micr 201 or equivalent. (Fall)

218 Advanced Parasitology (1 or 2) — Millar

For medical students; open to qualified graduate students. Study of host-parasite relationships, including laboratory procedures. 10 sophomores or juniors. (Fall)

219 Malariology (1) — Kassira and Staff

The general principles of the diagnosis, life cycle, pathogenicity, treatment, and prevention of malaria. Prerequisite: Epid 201 or equivalent. (Fall)

230 Biostatistics (3 or 4) — Hurley, Manos

Introduction to statistical analysis, the theory of measurements and distribution, including significance testing, basic concepts of probability and association, sampling techniques, design of experiments, and introduction to computers. (Fall and spring)

295 Research in Epidemiology (arr.) — Staff

Participation in experimental studies in infectious diseases and research in community medicine. Admission by permission of Department. (Fall and spring)

299–300 Thesis Research (3–3) — Staff

(Fall and spring)

***301 Epidemiology and Environmental Health (1)** — Staff

Lectures and seminars. Emphasis on means of organizing community to provide epidemiological solutions to health problems, developing an awareness of health resources and significant socioeconomic considerations in bringing total health to the community, showing importance of health as related to individual citizens. World health problems. Prerequisite: Micr 201 or equivalent. (Spring)

351 Global Epidemiology (1) — Staff

For medical students; open to graduate students by arrangement. Geographic pathology of disease and international aspects of disease prevention and control, including world demographic problems. (Fall)

352 Seminar: Experimental Epidemiology (1) — Staff

For medical students; open to graduate students by arrangement. Student participation in definitions, design, and methods for developing epidemiologic studies of diseases. Coordinated so that protocol developed can be applied to field use. 10 sophomores. (Fall)

353 Military Preventive Medicine (1) — Millar

Operational medicine, environmental and sanitation problems, epidemiologic diseases of military importance and their prevention and control. Medical aspects of aerospace and submarine medicine. Sophomores. (Fall)

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* Required for medical students.

354 **Seminar: Human Ecology** (1) — Lee and Staff

Ecology—man within the framework of reference—physical and cultural anthropology, geography, sociology, urban planning, public health, and public administration. (Fall)

380 **Methods in Public Health** (5 or 10) — Staff

Rotation through all divisions, including mental health, maternal and child health, environmental medicine, communicable diseases; field trips. 15 seniors; 4- or 8-week elective periods. D.C. Dept. of Public Health (December–May)

382 **Clinical Practice of Public Health** (10) — Staff

Study in depth of public health practice, participating as member of a mobile unit screening for various diseases in the community. 1 senior; 8-week elective periods. D.C. Dept. of Public Health (December–May)

384 **Research in Public Health** (10) — Staff

Supervised research; the student selects the topic from a broad range of public health problems, including mental health, maternal and child health, environmental medicine, epidemiological methods, biostatistics. 5 seniors; 8-week elective periods. D.C. Dept. of Public Health (December–May)

385 **Studies in Cardiovascular Disease** (5) — Zukel

Participation in one or more current studies at the National Heart and Lung Institute; selection by the student. 2 seniors; 4-week elective period (February 28–March 26)

387 **Diseases of the Tropics** (5 or 10) — Staff

Diagnosis, treatment, epidemiology, and laboratory aspects of exotic diseases; experience in the delivery of health care in the tropics. 1 senior; 4- or 8-week elective periods—to be arrangd.

398 **Advanced Reading and Research** (arr.) — Staff

Limited to students preparing for Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) — Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Medical and Public Affairs

Professor Murdock Head *(Chairman)*
Professorial Lecturer J.E. Bryan
Associate Professor C.W. Shilling

302 **The Physician, the Patient, and the Public** (1) — Staff

A series of forum sessions devoted to the social and political environment of medical practice, the changing nature of the doctor-patient relationship, the search for a new generalist, the future of specialism, the evolution of

new patterns of delivering and financing patient care, the developing roles of government, voluntary insurance and health organizations, group practice units, labor, and industry and consumer agencies. (Spring)

351 **Forensic Medicine** (2) Sharpe*, Head

Open to sophomore medical students. Examples drawn from the range of problems arising when the professional interests of lawyers and physicians overlap. Problem contexts include malpractice, personal injury litigation, licensure and discipline, ethics and economics, hospitals and other institutions of practice, and compelled treatment. (Fall)

Medicine

Professors T.M. Brown, M.J. Romansky, L.K. Alpert, J.M. Evans, A.E. Parrish, F.W. Wolff, Halla Brown, Irene Tamagna, J.J. Feffer, W.N. Jensen *(Chairman)*, Leo Oliner, T.E. Piemme, T.C. Chalmers, Leon Bernstein, J.P. Naughton, J.D. Chase, G.A. Kelser, Jr. *(Associate Chairman)*

Clinical Professors A.G. Prandoni, J.J. Rheingold, T.S. Sappington, A.B. Rosenbaum, T.J. Greenwalt, Benjamin Manchester, L.E. Putnam, M.H. Stolar, C.W. Thompson, Morton Seidenfeld *(Clinical Psychology)*

Associate Professors W.R. Felts, Jr., Irene Siu, R.C. Fowler, Ariel Hollinshead *(Research—Pharmacology)*, Mary Watt, N.C. Kramer, Milton Corn, Rashid Massumi, J.A. Curtin, J.K. Viktora *(Research—Biochemistry)*, J.C. Penhos *(Research—Endocrine Research)*, H.W. Clark, Jr. *(Research—Biochemistry)*, D.J. Massaro, J.B. O'Connell, Lawrence Pierce, W.O. Dobbins III, R.G. Loudon, K.L. Becker, J.M. Bacos, J.D. Finkelstein, R.P. Kaufman, K.M. Stevens, Mahmoud Mourad, Tsung Cheng, L.S. Lessin, Joseph Lindsay, Jr., A.F. Mastellone *(Physical Medicine)*

Associate Clinical Professors Joseph Ney, J.W. Latimer, Jr., T.J. Abernethy, F.S. Bacon, Elizabeth Hill, S.J.N. Sugar, H.D. Ecker, C.W. Jones, E.S. Gladsden, Maurice Mensh, F.J. Murray, E.P. Parker III, M.H. Rosenberg, Milton Gusack, Jack Kleh, H.M. Silver, J.P. Mann, Edward Adelson, R.R. Belton, S.D. Loube, Arthur Ruskin, C.A. Rosenberg, H.E. Ticktin, L.J. Thomas, W.O. Bailey, Jr., Ruth Benedict, Louis Ross, S.W. Kirstein, Israel Kessler, W.D. Brill, Marvin Fuchs, C.A. Schulman, Alfred Baer, Herbert Abramson, Bertel Nelson, J.M. Pisani, S.W. Bush, Joseph King, M.H. Jacobson, J.P. Nasou, Raymond Standard, P.A. Klieger, Henry Simmons

Assistant Professors F.A. Peck, P.A. Gorman, Karl Wipplinger, J.S. Bailey *(Research—Microbiology)*, B.F. Johnson *(Research—Clinical Pharmacology)*, T.R. Shworles *(Social Psychology)*, S.H. Danovitch, Gerrit Besselaar *(Pharmacology)*, Philip Witorsch, J.K. Cooper, P.M. Berkman, Paul Hamosh, J.R. Shapiro, Robert Keimowitz, C.H. Chan, G.H. Nachnani, John LaRosa, K.B. Singh, J.C. Rios

Assistant Professorial Lecturer P.O. Woolley, Jr.

Assistant Clinical Professors T.A. Gonder, David Horwitz, R.B. Castell, S.T. Gibson, M.H. Rose, Adolph Friedman, R.B. Miller, F.D. Chapman, R.G.

* Dr. Sharpe is Professor of Law in the University's National Law Center.

Taylor, J.W. Long, J.F. Ambury, T.L. Hartman, Boris Rabkin, L.A. Craig, Jr., A.W. Danish, Alvin Seltzer, C.E. Law, E.L. Rea, Conrad Gossels, H.O. Mott, J.H. Watson, N.H. Rubenstein, W.L. Stone III, B.H. Ostrow, C.D. Cooper, W.R. Ehrmantraut, G.A. Chapman, F.M. Gross, Eleanor Makel, Silas Babin, Jr., Alice Brigham, Jack Crowell, D.S. Davis, J.H. Epstein, F.K. Harris II, R.F. Dyer, E.H. Bauersfeld, William Lewis, E.J. Leonard, H.I. Passes, C.W. Foulke, A.A. Lear, O.W. Donnelly, R.S. Poole, H.C. Sadin, S.J. Talpers, W.L. Hall, George Sharpe, Raymond Scalettar, M.A. Sislen, G.C. Buchanan, G.T. Economos, Irwin Ardam, S.E. Barr, H.A. Moskovitz, J.T. Hagenbucher, G.N. Polis, W.F. Morrissey, R.A. Apter, M.S. Artenstein, J.E. Stauch *(Research)*, Jean Lucas, B.R. Cooperman, Francis Chucker, Gilbert Hurwitz, R.S. Wilkinson, W.E. Gallinek, L.H. Biben, W.H. Harvey, William Kurstin, Dorothea Chapman, L.H. Fenton, F.J. Jarsen, C.W. Humphreys, Jr., Paul Schlein, D.J. Hand, Ruben Lopez-Toca, P.A. Haber, William Whitmore, Jr., Francisco Gnecco-Mozo, J.H. Piedra, D.M. Kessner, M.S. Wolfe, C.H. Oliver, Jr., A.B. Cady, W.T. Moore, D.A. Morowitz, Guiseppe Balsamo, G.J. Thorpe, A.B.C. Knudson

Instructors S.H. Mendelson, J.R. Whiteman *(Research)*, Raymond Haddad, Hemant Joglekar, R.K. Sarin, Ma. Eleanor Flores, Vincent Johnson, Jr., F.A. Siegel *(Research)*, Hoyoko Yahanda, Manoochehr Pooya, Olga Pruna, Catherine Chura *(Clinical Pharmacology)*, K.J. Dickie, R.J. Santos

Clinical Instructors N.K. Bohrer, N.G. Goodman, J.D. Herman, Scheldon Kress, Frederick Meyers, Lily Ruckstuhl, C.U. Shilling, H.O. Schindelar, R.M. Kaufman, Andre Barrabini, Robert Kramer, F.J. Borsody, Richard Schoenfeld, M.J. Halberstam, D.W. Datlow, G.G. Kay, R.A. Fischer, R.M. Huffman, E.B. Thompson, Florentino Palmon, S.J. Conway, L.P. Appel, M.A. Herman, R.O. Knox, R.S. Waldman, R.W. Turner, C.W. Kinzer, S.A. Schwartz, Andree Thomas, Marvin Schneider, Fidel Quintana, Gladys Rosenstein, Herman Rosenstein, A.G. Brody, Harris Kenner, N.P. Trujillo, I.V. Magal, G.A. Tralka, L.F. Barker, R.J. Lindeman, D.D. Haut, Isaac Weiszer, P.R. Lenz, A.J. Anderson, P.G. Rochmis, J.F. Mermel, Richard Hochman, P.J. Sullivan, S.H. Schachner, M.M. Shefferman, PooLiang Chang, E.J. Chap, L.M. Weiss, N.T. Connally, Bernard Grand, J.C. Perkins, A.M. Mondzac, H.J. Alpert, P.V. Holland, Leo Janis, R.A. McConnaughy, S.R. Rishi, A.M. Gotto, Jr., Israel Spector, B.G. Vlalukin, C.T. Caskey, R.G. Masson, Devanhalli Ramaswamy, F.H. Burbank, Dorothy Millon, K.S. Gimbel, J.H. Holbrook, D.L. Pearle, Charles Lightdale

Special Lecturers Sol Katz *(Pulmonary Disease)*, R.W. Berliner *(Renal Disease)*, W.L. Nalls *(Pulmonary Disease)*, Albert Sjoerdsma *(Internal Medicine)*, D.S. Frederickson *(Internal Medicine)*, T.W. Mattingly *(Cardiology)*

*301 **Introduction to Medicine** (8) **Staff**

(Formerly Med 301 Physical Diagnosis (4), Med 302 Laboratory Medicine (2), and Med 303 Principles of Internal Medicine (2))

Principles and practice of internal medicine. Clinical application of laboratory examinations of blood, body fluids, exudates, etc. Theoretical and practical application of principles of physical diagnosis; training with bed patients under individual instruction. Designed to develop ability in examination of patients and case history taking. Univ., D.C. Gen., and affiliated hosps. **(Spring)**

* Required for medical students.

*305 **Inpatient Clerkship I** (10) — Staff

Training in comprehensive study of patients; history and physical examination; ward rounds, consultations, conferences, preceptorial teaching, seminars. Univ Hosp. and Wash. Hosp. Center. (8-week periods throughout academic year)

*306 **Inpatient Clerkship II** (5) — Staff

Continuation of Medicine 305. V.A. and D.C. Gen. hosps. (Spring—4 weeks)

*308 **University Clinic** (10) — Watt and Staff

Studies of ambulatory patients under close supervision. Daily clinics in general medicine and various specialties; conferences on current cases. Univ. Clinic (8-week periods throughout academic year)

311 **Rehabilitation of Teenage Drug Offenders** (1) — LaRosa

Students participate one evening a week in the youth rehabilitation program of the Narcotics Treatment Agency of the District of Columbia. Limited to 18 2nd-year medical students. (Fall—3 hours a week)

317 **Exercise ECG: Diagnosis of Heart Disease and Evaluation of Physical Fitness** (5) — Gorman

Application of graded treadmill exercise ECG to diagnostic problems in ischemic heart disease and to evaluation of physical fitness. 1 senior; 4-week elective periods. Univ. Clinic (December–May)

318 **Intensive and Coronary Care** (5 or 10) — Reefe†

Principles and techniques of and practice in emergency care in an active intensive-care unit. Participation as a member of a team in a clinical program involving complete study and therapy of acute emergency problems and acute coronary disease. Teaching rounds, seminars. 2 seniors; 4- or 8-week elective periods. V.A. Hosp. (December-May)

319 **Renal and Electrolyte Disorders** (5) — Berkman

Participation in consultations on renal and electrolyte abnormalities; follow-up of patients previously seen. Experience in the examination of the urinary sediment, peritoneal, and perhaps hemodialysis. Participation three mornings a week in the Journal Club, in association with the Endocrine Unit. Collateral reading, conferences, and ward rounds. By arrangement, a student may participate in a research project during an extended elective period. 1 senior; 4-week elective periods (extended by arrangement). Wash. Hosp. Center (December–May)

320 **Research: Allergy or Related Field** (30) — H. Brown

Research project in clinical or experimental allergy or a related field. 1 or 2 seniors; minimum of 6 months. (December–May)

321 **Clinical Gastroenterology** (5) — Danovitch

Experience in clinical gastroenterology: consultations and follow-up of patients. Presentation of patients at conferences; observations and diagnostic procedures, including endoscopy; review of histology of lesions of intestinal tract and liver. 1 senior; 4-week elective periods. Wash. Hosp. Center (December–May)

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* Required for medical students.
† Dr. Reefe is Acting Chief of Medical Service at the Veterans Administration Hospital.

322 **Clinical Gastroenterology** (10) Dobbins

Intensive clinical experience with patients who have digestive diseases, including those of the gastrointestinal tract, liver, and pancreas. Consultations, teaching rounds, and research seminars. 4 seniors; 8-week elective periods (extended by arrangement). V.A. Hosp. and Univ. Clinic (December–May)

323 **Morphology of the Intestines** (10) Dobbins

Research designed to acquaint the student with a variety of morphologic techniques used in the study of mucosal disease of the gastrointestinal tract. Includes electronic microscopy and light microscopy techniques—phase and fluorescent microscopy. Open to a senior who preferably will be able to continue on a part-time basis after completion of elective period. 1 senior; 8-week elective periods (extended by arrangement). Univ. Clinic (December–May)

324 **Research in Mechanisms of Sodium Homeostasis** (15) Keimowitz

Supervised laboratory research on the mechanisms of sodium homeostasis —*in vitro* and *in vivo* animal studies using various techniques, including isotopic tracer experiments. Reading assignments of relevant physiological and clinical literature. 1 senior; 12-week elective periods. Univ. Hosp. (December–May)

325 **Biochemical Abnormalities in Disorders of Lipoprotein Metabolism** (10) LaRosa

Experience in the use of modern techniques of protein separation, including ultracentrifugation, electrophoresis, and chromatography; experience in handling radioactive isotopes. Clinical experience with patients with hyperlipoproteinemia. 1 senior; 8-week elective periods. Univ. Hosp. and National Heart and Lung Inst. (December–May)

326 **Ambulatory Health Care** (10) Piemme

Participation in a combined community health program in the Division of General Medicine. Specific elements involving the capacity to deliver health care within a community. Conferences, reading assignments in the concepts of community health and health care delivery. Exchange with similar programs in other universities is possible if students wish to elect more than the 8-week minimum. 2 seniors; 8-week elective periods. (December–May)

327 **Clinical Hematology** (5) Pierce

Clinical evaluation of inpatients and outpatients with symptoms referrable to the myelopoietic system using bedside and laboratory investigative parameters. 1 senior; 4-week elective periods. Wash. Hosp. Center (December–May)

328 **Endocrinology** (5) Shapiro

The student will evaluate patients referred to the Endocrinology Service, take part in planning diagnostic work-ups or therapy programs, and be responsible for case presentations. Exposure to techniques used in the Endocrinology Laboratory such as protein binding determinations and radio-immuno assay of hormones. Participation in Journal Club. 1 senior; 4-week elective periods. Wash. Hosp. Center (January 31–May 21)

329 Pulmonary Diseases (5) Witorsch

Performance and interpretation of pulmonary function studies, including ventilatory studies, diffusing capacity, and blood gas analysis; daily teaching rounds and supervised consultations on patients with various pulmonary and infectious diseases. Participation in the Pulmonary Clinic; techniques and principles of inhalation therapy. 1 senior; 4-week elective periods. Wash. Hosp. Center (December 6–April 23)

360 Hematology Preceptorship (5) Rheingold

Observation of and participation in diagnosis and treatment of patients with hematologic disorders. 1 senior; 4-week elective periods. Univ. Hosp. and Physician's Office (December–May)

362 Cardiology (5) Czarnecki*

Opportunity to observe and take part in cardiac evaluation and patient care under tutorial supervision. Participation in electrocardiograph interpretation and other diagnostic procedures as well as activities in the Intensive Care Units, Pediatric Wards, and Cardio-Thoracic Surgical program. 3 seniors; 4-week elective periods. Walter Reed Gen. Hosp. (December–May)

363 Pulmonary and Communicable Diseases (5) Zurek†

Clinical experience with a wide variety of chronic pulmonary and infectious disease problems. Thoracenteses and pleural biopsies, spinal taps, and pulmonary function testing. Weekly basic pulmonary physiology lectures and attendance at Medical-Surgical Chest conferences. 2 seniors; 4-week elective periods. Walter Reed Gen. Hosp. (December–May)

364 Renal-Dialysis Service (5) Knepshield‡

Exposure to a wide variety of renal diseases, hemo- and peritoneal dialysis, renal transplantation. Observation in renal physiology laboratory. 2 seniors; 4-week elective periods. Walter Reed Gen. Hosp. (December–May)

366 Clinical Endrocinology (5) Becker

Clinical experience in endocrinology, metabolism, and genetics. Student will be given opportunity to examine endocrine patients, make preliminary diagnosis, and assist in treatment. 3 seniors; 4-week elective periods (extended by arrangement). V.A. Hosp. (December–May)

368 Effect of Drugs in Man (5) Viktora, Mauger§, Wolff

Correlation between clinical research at the bedside and laboratory experimentation. Participation in clinical and laboratory follow-up of patients. Introduction to long-term controlled studies on the effects of drugs in hypertension with exposure to data retrieval, programming, and computer analysis. 2 seniors; 4-week elective periods. Wash. Hosp. Center (December–May)

369 Metabolic Fate of Drugs in Animals and Man (10) Viktora, Mauger§, Rzeszotarski‖, Wolff

Introduction to methods used in the study of drug metabolism, including

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* Dr. Czarnecki is Chief of Cardiology at the Walter Reed General Hospital.
† Dr. Zurek is Chief of Pulmonary Disease at the Walter Reed General Hospital.
‡ Dr. Knepshield is Chief of Renal-Dialysis Service at the Walter Reed General Hospital.
§ Dr. Mauger is with the Division of Clinical Pharmacology at the Washington Hospital Center.
‖ Dr. Rzeszotarski is with the Division of Clinical Pharmacology at the Washington Hospital Center.

qualitative and quantitative chromatography, thin-layer, gas liquid chromatography, electron capture, principle of mass spectroscopy. 4 seniors; 8-week elective periods. Wash. Hosp. Center (December–May)

370 **Inpatient Medicine (5)** Apter

Full participation in diagnostic studies and clinical management of bed patients on Medical Service. Teaching rounds, conferences. 4 seniors; 4-week elective periods. Fairfax Hosp. (December–May)

371 **Arthritis and Rheumatic Diseases** (5) Felts

Introduction to clinical problems in the diagnosis and treatment of arthritis and rheumatic diseases. Students will work with arthritis research group in adaptation of computer study of clinical problems. 2 seniors; 4-week elective periods. Univ. Clinic (December-May)

372 **Clinical Renal Disease (5)** Parrish, N. Kramer

Participation in the clinical and laboratory procedures used in the study of renal disease. Ward rounds, consultations, conferences, and seminars. 2 seniors; 4-week elective periods. D.C. Gen. and Univ. hosps. (December–May)

373 **Acting Intern in Medicine (5)** Corn

Each student, assigned to a patient-care ward team, functions as an intern and assumes basic responsibility, under supervision of a resident and attending physician, for the management of approximately six patients. Participation in case presentation; scheduled conferences. 8 seniors; 4-week elective periods. D.C. Gen. Hosp. (December–May)

375 **Studies in Hypertension (5)** Tamagna

Participation in care of inpatients and outpatients and in research projects. 1 senior; 4-week elective periods. Univ. Hosp. and Clinic (December–May)

376 **Total Patient Care (5)** Tamagna

Participation in teamwork program for total patient care, including clinical and psychological studies and rehabilitation; conferences, research. 1 senior; 4-week elective periods. Univ. Hosp. and Clinic (December–May)

377 **Hepatic and Metabolic Diseases** (5) Ticktin

Participation in clinical studies of patients with hepatic and pancreatic diseases; endoscopy, splenoportography, liver biopsy; research in enzymes and ammonia metabolism in hepatic diseases. 2 seniors; 4-week elective periods. Univ. Hosp. (December–May)

378 **Endocrinology and Cancer Chemotherapy** (5) Alpert

Clinical work; emphasis on endocrinology (and metabolism) or cancer chemotherapy, depending on the student's choice. 2 seniors; 4-week elective periods. Univ. Clinic (January 31–March 26)

379 **Hepatic Diseases (5)** Finkelstein

Full participation in clinical program involving evaluation and management of patients with all types of hepatobiliary disease using routine and specialized techniques; teaching rounds, clinical and research seminars. Additional clinical or laboratory research experience encouraged. 2 seniors; 4-week elective periods. V.A. Hosp. (December–May)

380 **Clinical Application of Tissue Immunology** (5) N. Kramer
Application of immunologic methods to study of human hypersensitivity states and metabolic diseases; serum proteins, including protein hormones and enzymes; research principles and methods. 1 senior; 4-week elective periods. Univ. Hosp. (December–May)

382 **Clinical Cardiopulmonary Physiology** (10) Massumi
Clinical and laboratory evaluation of cardiac and pulmonary problems; training in ECG, phonocardiography, cardiac catheterization, angiocardiography, pulmonary function testing. Research encouraged. 1 senior; 8-week elective periods. D.C. Gen. Hosp. (December–May)

383 **Laboratory Studies of Human Respiratory Viruses** (10) Perkins
Participation in a research program involving the characterization of new respiratory viruses; study of the role of nasal secretory antibody in upper respiratory disease. 1 senior; 8-week elective periods. N.I.H. (December–May)

386 **Inpatient Medicine and Medical Emergencies** (5) Curtin, Bacos
Assignments to Intensive Care Unit and Emergency Room; ward rounds and conferences, radiologic and pathologic follow-up; library assignments. 2 seniors; 4-week elective periods (extended by arrangement). Wash Hosp. Center (December–May)

387 **Renal Diseases** (5 or 10) M. Jacobson
Hospital and office consultations; care of patients with renal disease, fluid, and electrolyte problems; renal function studies as applied to patient care; participation in renal conferences at University Hospital. 1 or 2 seniors; 4- or 8-week elective periods. (January 31–May 21)

388 **Experience in Allergy** (15) H. Brown
Clinical experiences in allergy; work-up of patients, skin testing, immunization. Immunology of allergy—conjunctival testing, patch testing, passive transfer, histamine release, gel difussion, tissue culture. 2 seniors; 12-week elective periods. Univ. Clinic (December–May)

391 **Clinical Cardiology** (10) Siu and Staff
Training in clinical cardiology with individual optional emphasis on hospital and office patient care, experience in the Coronary Care Unit, Heart Station, hypertension studies, exercise ECG laboratory. Catheterization laboratory and when possible a study project. 12 seniors; 8-week elective periods. Univ. Hosp. and Clinic (December–May)

392 **Family Practice Preceptorship** (5) J.P. Anderson[*]
Preceptorship in small urban community family practice. 1 senior; 4-week elective periods. Waynesboro, Va. (December–May)

393 **Clinical Hematology** (5) Corn
Clinical and laboratory studies of patients with hematologic disorders; bone marrow and peripheral blood smears, hemoglobin electrophoresis, evaluation of coagulation mechanism. 1 senior; 4-week elective periods. D.C. Gen. Hosp. (December–May)

395 **Metabolic Disorders in Diabetes** (5) Penhos
Intensive and practical studies of the technique to produce surgical, chemical, and hormonal diabetes. Participation in research on carbohydrate.

[*] Dr. Anderson is in private practice in Waynesboro.

protein, and lipid metabolism: insulin secretion in isolated organ perfusions. Seminars and participation in Journal Club. 4 seniors; 4-week elective periods. V.A. Hosp. (December–May)

396 **Research in Endocrinology** (5) Penhos

Participation in endocrine research, including laboratory experience, experimental surgery, biochemical methods, and *in vivo* and *in vitro* endocrine studies. Weekly seminars and discussions will correlate experimental results with clinical observations. 4 seniors; 4-week elective periods. V.A. Hosp. (December–May)

398 **Introduction to Cardiology** (5) Bacos

Clinical cardiology, correlating bedside approach to cardiovascular diagnosis with special diagnostic studies, including phonocardiography, atrial electrocardiography, cardiac catheterization, angiocardiography. 1 senior; 4-week elective periods. Wash. Hosp. Center (December–May)

399 **Research in Sulfur Amino Acid Metabolism** (10) Finkelstein

Investigation of factors regulating methionine metabolism in mammalian liver utilizing assays of enzyme activity, *in vitro* hepatic perfusion, and *in vivo* metabolic studies. 1 senior; 8-week elective periods. V.A. Hosp. (December–May)

Microbiology

Professors Mary Louise Robbins, R.C. Parlett *(Chairman)*, Rudolph Hugh
Professorial Lecturers F.B. Gordon *(Virology)*, Dorothy Heilman *(Cellular Immunology)* M.S. Legator *(Microbial Genetics)*, E.M. Lerner II, L.J. Griffith
Associate Professors L.F. Affronti, Melvin Reich
Assistant Professors G.L. Wright, Jr., Yang-Ming Chu, Kun-yen Huang
Assistant Professorial Lecturers P.J. Price, Rosalie De Giovanni-Donnelly

*201 **Medical Microbiology** (6) Parlett and Staff

For medical students; open to qualified graduate students. Bacteria, rickettsiae, viruses, yeasts, molds, protozoa, metazoa which relate to the health and disease of man—cultural studies, methods of diagnoses, theories. Laboratory fee for nonmedical students, $16. (Spring)

214 **Tissue Cell Culture and Somatic Variation** (4) Chu, Price

Techniques of tissue culture and means of studying somatic variations. Prerequisite: Micr 201 or equivalent. (Spring)

219–20 **Scientific Writing for Graduate Students** (1–1) Robbins

Required of all graduate students prior to writing a thesis or dissertation. (Academic year)

221 **Methods of Scientific Presentation for Graduate Students** (1) Wright

Photography and graphic arts presentation of research data for publication and scientific meetings. Prerequisite: Micr 219–20. Laboratory fee, $16 (Fall)

*Required for medical students.

225 **Microbial Physiology I** (3) — Affronti, Reich

Morphology and biochemistry of various microorganisms with emphasis on bacteria. Prerequisite: Bioc 201, Micr 201. (Fall)

226 **Microbial Physiology II** (3) — Affronti, Reich

Effects of physical and chemical agents on microorganisms with emphasis on antibiotics. Prerequisite: Micr 225 or permission of instructor. (Spring)

230 **Immunology** (4) — Wright

Fundamental immunologic concepts. Serologic and immunologic procedures as applied to clinical and research situations emphasized in the laboratory. Prerequisite: Micr 201 or equivalent. Laboratory fee for nonmedical students, $16. (Fall)

231 **Cellular Immunology** (2) — Parlett, Wright

Study of immunological functions of reticulo-endothelial tissues, theories of autoimmunity, graft rejection, tumor immunity, delayed hypersensitivities, and heritable immunogenic defects. (Fall)

233 **Molecular Biology of Viruses** (4) — Robbins, Huang

Biochemical and genetic characterization of viruses. Prerequisite: Micr 201 or equivalent. Laboratory fee for nonmedical students, $16. (Fall)

235 **Systematic Bacteriology** (2) — Hugh

History of bacterial classification, international rules of nomenclature as applied to bacteria, development of bacterial classification based upon relationships, survey of characteristics of bacterial groups. Prerequisite: Micr 201 or equivalent. (1972–73 and alternate years: fall)

251 **Bacteriology** (2) — Hugh

Primarily elective course for medical students; open to graduate students. Clinical situations involving bacteriology. Prerequisite: Micr 201 or equivalent. (Fall)

255 **Virology** (2) — Huang, Robbins

Primarily elective course for medical students; open to graduate students. General principles of virology; emphasis on clinical situations. Prerequisite: Micr 201 or equivalent (Fall)

257 **Experimental Immunochemistry** (3) — Wright

Biochemical and physiochemical characterization of antigens and antibodies. Prerequisite: Bioc 221–22 or equivalent, Micr 230. Laboratory fee for nonmedical students, $16. Limited enrollment. (1971–72 and alternate years: spring)

258 **Microbial Genetics** (2) — De Giovanni-Donnelly, Legator

Survey of microbial systems that depict basic concepts of genetic principles. Prerequisite: Micr 201 or equivalent. (Spring)

277–78 **Seminar: Microbiology** (1–1) — Staff

Required of all graduate students. (Academic year)

280 **Virology** (10) — Robbins

Selected problems; library assignments, laboratory studies. 4 seniors; 8-week elective periods. School of Medicine (December–May)

281 **Bacterial Physiology** (5) Reich

Selected problems; library assignments, laboratory studies. 5 seniors; 4-week elective periods. School of Medicine (December–May)

282 **Immunology** (5) Parlett

Research problems. 3 seniors; 4-week elective periods. School of Medicine (December–May)

283 **Bacteriology** (10) Hugh

Selected problems; library assignments, laboratory studies. 2 seniors; 8-week elective periods. School of Medicine (December–May)

284 **Microbial Genetics** (5) De Giovanni-Donnelly

Research problems. 3 seniors; 4-week elective periods. School of Medicine (December–May)

285 **Immunologic Characterization of Cell Lines in Tissue Culture** (10) Chu, Price

Preparation of specific antigens from a cell strain and production of antibodies against this strain in appropriate mammalian host; identification of unknown cell types using tissue culture, serology, immunochemistry. 2 seniors; 8-week elective periods. (December–May)

286 **Diploid Cell Lines in Tissue Culture** (10) Chu, Price

Mammalian cells growing on glass surfaces in various media, staining chromosomes and determining chromosome pattern and number, methods of cell preservation such as liquid nitrogen freezing. 2 seniors; 8-week elective periods. (December–May)

287 **Transformation of Cells in Tissue Culture** (10) Chu, Price

Conversion of normal cell lines in tissue culture to heteroploid cell lines, demonstration of cancerous nature of transformation by inoculation of hamster cheek pouch. Polyoma virus and SB 40 used with various cell types, including human embryo. 2 seniors; 8-week elective periods. (December–May)

293 **Special Topics in Microbiology** (arr.) Staff

Selected topics in microbiology. May be repeated for credit. (Fall and spring)

295 **Research in Microbiology** (arr.) Staff

Content differs each time the course is offered; may be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Neurological Surgery

Clinical Professors J.M. Williams, H.V. Rizzoli *(Acting Chairman)*, H.H. Am
merman
Associate Professor J.L. Fox
Associate Clinical Professors J.P. Murphy, L.G. Kempe, N.H. Horwitz
Assistant Professor Emanuele Mannarino
Assistant Clinical Professors G.M. Swain, Ruth Jakoby, A.P. Hustead, T.H
Milhorat, W.M. Hammon
Clinical Instructors R.A. Mendelsohn, J.W. Barrett, C.P.H. Carroll, F.D
Cooney

Staff

*301 **Neurological Surgery** (1)

Clinical lectures and demonstrations dealing with form and function in nervous system. Transition between basic sciences and neurological surgery stressed and correlated. (Fall)

†380 **Clinical Neurology and Neurosurgery** (5) Stevens, Ammerman

Clinical clerkship in neurology and neurosurgical service. Emphasis on neurologic examination; indications for special neurologic tests, e.g., arteriograms, pneumoencephalograms, etc.; and operative procedures. 2 seniors; 4-week elective periods. Univ. Clinic (December–May)

Kempe

381 **Clinical Neurosurgery** (5)

Participation in all departmental activities: ward rounds, daily conferences, radiographic and pathologic studies, operating room procedures, emphasis on studies of cerebral circulation. 2 seniors; 4-week elective periods. Walter Reed Gen. Hosp. (December–May)

Fox

385 **Clinical Neurosurgery** (5)

Clinical clerkship will include experience with diagnostic procedures: arteriograms, pneumoencephalograms, myelograms, and assisting in operating room; conferences and ward rounds. 1 senior; 4-week elective periods. V.A. Hosp. (December–May)

Rizzoli

387 **Clinical Neurosurgery** (5)

Participation in all departmental activities, including ward rounds, daily conferences, radiographic and pathologic studies, and operating room procedures. 2 seniors; 4-week elective periods. Wash. Hosp. Center (December–May)

Neurology

Professors Harold Stevens, Sean O'Reilly *(Chairman)*, M.J. Malone
Clinical Professors R.H. Groh, W.K. Engel
Professorial Lecturers K.M. Earle, N.P. Goldstein
Associate Clinical Professors A.S. Dekaban, Franklin Meister, H.H. Schwarz
Antonio Stazio

* Required for medical students.
† An interdepartmental course offered by the departments of Neurological Surgery and Neurology

Assistant Professors M.N. Ozer, Mary Coleman, Ann Barnet, J.S. Haller, Karin Nelson

Assistant Clinical Professors G.D. Weickhardt, Ntinos Myrianthopoulos, Virginia Duggins, Cosimo Ajmone Marsan

Clinical Instructors M.C. Korengold, R.H. Robertson, Kristof Abraham, E.C. Wilner, Miryam Davis, Howard Silby

*301 **Neurology (1)** O'Reilly, Stevens

Clinical lectures and demonstrations dealing with form and function of nervous system. Transition between basic sciences and clinical neurology stressed and correlated. (Fall)

†380 **Clinical Neurology and Neurosurgery (5)** O'Reilly, Stevens, Ammerman

Clinical clerkship in neurology and neurosurgical service. Emphasis on neurologic examination; indications for special neurologic tests, e.g., arteriograms, pneumoencephalograms, etc.; and operative procedures. 2 seniors; 4-week elective periods. Univ. Hosp. (December–May)

382 **Pediatric Neurology (5)** Malone and Staff

Clinical clerkship in diagnostic study and care of inpatients and outpatients; conferences and teaching sessions. 2 seniors; 4-week elective periods. Children's Hosp. (December–May)

383 **Clinical Neurology (5)** Schwamb

Emphasis on neurological examination and basic sciences, including neuroanatomy, as applied to clinical material. 2 seniors; 4-week elective periods. Walter Reed Gen. Hosp. (December–May)

386 **Clinical Neurology (10)** Goldstein

Clinical clerkship under close supervision of highly experienced clinicians and teachers. Trainees prepare histories and conduct physicals, attend rounds and conferences, assist in routine procedures. Abundant clinical material available. 2 seniors; 8-week elective periods. Mayo Clinic (December–May)

Obstetrics and Gynecology

Professors John Parks, R.H. Barter, J.G. Sites *(Chairman)*

Clinical Professors S.M. Dodek, J.A. Dusbabek, J.K. Cromer

Associate Professors Benny Waxman, Larry McGowan

Associate Clinical Professors C.K. Fraser, W.T. Lady, W.P. McKelway, J.W. Pearson, Jr., Shirley Martin, M.S. Kaufman, M.P. Footer, Donald Walters, J.M. Friedman, B.W. Richwine, Peter Soyster

Assistant Professors C.B. Jacobson, J.L. Marlow

Assistant Clinical Professors Caroline Jackson, T.A. Wilson, J.R. Epstein, S.H. Shea, G.L. Jarvis, N.J. Price, J.C. Walsh, L.M. Liverett, H.P. Treichler, W.H. Cooper, I.W. Rovner, M.W. Sandmeyer, Jr., N.M. Tart, R.B. Nelson, Louis Goldstein, George Speck, A.W. Winshel, R.V. Erkenbeck, L.Q. Pugs-

*Required for medical students.
†An interdepartmental course offered by the departments of Neurology and Neurological Surgery.

ley, H.L. Kotz, O.I. Dodek, Jr., H.A. Donald, Julius Fogel, A.I. Robins, R.E. Rogers

Instructor L.F. Arias-Bernal

Clinical Instructors A.S. Bright, Elizabeth Crisp, S.M. Belinsky, E.E. Gahres, D.R. Carlson, E.E. Cunningham, Geraldine Paul, M.H. Hird, S.F. Stewart, Jr., Josiah Sacks, R.E. Badwey, G.R Hewlett, E.W Titus, Jr., T.H. Gresinger, J.M. Close, E.R. Kolvereid, D.M. Margulies, J.C. Skilling, S.D. Cooley, L.E. Fettig, R.W. Smith, W.D. Wallace, Jr., P.H. Perkins, R.M Regan, B.A. Band, C.E. Townsend, D.H. Martin, W.R. Perkins, L.C. Radice, J.E. Anderson, A.A. de Moya, C.J. Gueriera, Martin Bertman, Erika Latchis, D.C. Meek, A.A. Becker, C.D. Lord, H.C. Beaver, Carlena Campbell, Meyer Rosenbaum

*301 **Obstetrics and Gynecology** (2) Sites, Waxman

Lectures and demonstrations covering entire field; emphasis on clinical management. (Spring)

*303 **Clinical Obstetrics and Gynecology** (10) Staff

Participation in all obstetrical and gynecological clinics, daily departmental conferences and ward rounds at University, Fairfax, and Columbia hospitals. Manikin demonstrations of mechanism of labor and various types of operative delivery. (Fall)

351 **Introduction to Clinical Practice** (1) C. Jacobson

Introduction of first-year medical students to patient situations by members of the clinical staff. Designed to stimulate questions and discussions regarding physical, financial, and moral implications of medical practice. 25 students. Univ. Hosp. (Spring)

376 **Clinical Obstetrics and Gynecology** (3) McKelway, Titus

Participation in office practice of obstetrics and gynecology. 1 senior; 4-week elective periods. (December–May)

377 **Clinical Obstetrics and Gynecology** (5) Cooper

Participation in office practice of obstetrics and gynecology. 1 senior; 4-week elective periods. (December–May)

378 **Clinical Obstetrics and Gynecology** (5) Pugsley, Cooley

Participation in office practice of obstetrics and gynecology. 1 senior; 4-week elective periods. (December–May))

379 **Clinical Obstetrics and Gynecology** (5) Footer, Friedman

Participation in office practice of obstetrics and gynecology. 1 senior; 4-week elective periods. (December–May))

380 **Gynecologic Oncology** (10) McGowan

Participation in the clinical inpatient and outpatient care of women with gynecologic cancer; related research in the areas of cytology. 1 senior; 8-week elective periods. Univ. Clinic (December–May)

381 **Clinical Obstetrics and Gynecology** (5) Waxman, Sites

Participation in office practice of obstetrics and gynecology. 2 seniors; 4-week elective periods. Univ. Clinic (December–May)

* Required for medical students.

383 **Clinical Obstetrics** (5) Nelson, Fraser

Includes prenatal clinics, lying-in periods, delivery and postpartum care; rounds, conferences, seminars. 2 seniors; 4-week elective periods. Wash. Hosp. Center (December–May)

384 **Clinical Gynecology** (5) Cromer, Gahres

Case assignments, rounds and conferences, including tumor board; gynecologic pathology, preparation for surgery, attendance at surgery, postoperative care. 2 seniors; 4-week elective periods. Wash. Hosp. Center (December–May)

385 **Clinical Obstetrics and Gynecology** (5) Price, Treichler

Participation in office practice of obstetrics and gynecology. 1 senior; 4-week elective periods. (December–May)

386 **Inpatient Obstetrics and Gynecology** (5) Rogers

Supervised instruction in large military hospital; rounds and conferences. 4 seniors; 4-week elective periods. Walter Reed Gen. Hosp. (December–May)

387 **Clinical Obstetrics and Gynecology** (5) Cooper, Walters, Jarvis

Participation in patient care; rounds and conferences. 2 seniors; 4-week elective periods. Sibley Memorial Hosp. (December–May)

388 **Clinical Obstetrics and Gynecology** (5) Price

All aspects of inpatient and outpatient obstetrical and gynecologic services; rounds, obstetrical-gynecologic conferences, gynecologic pathology conferences; obstetrical anesthesia; Emergency Room consultations. Home visits to selected patients with Health Department Nurse. 2 seniors; 4-week elective periods. Fairfax Hosp. (December–May)

389 **Clinical Obstetrics and Gynecology** (5) Marlow

Participation in patient care, rounds, and conferences. 2 seniors; 4-week elective periods. Columbia Hosp. (December–May)

391 **Cytogenetics** (1) Arias-Bernal

Clinical chromosomal anomalies in man, experimental design and data analysis in cytogenetics, two cytogenetics techniques, sex chromatin analysis, tissue culture procedures. Special students admitted with approval of instructor. (1972–73 and alternate years: fall)

392 **Reproductive Genetics** (1) C. Jacobson

For medical students; open to graduate students with permission of instructor. Lectures with guest speakers, covering current methodology. Emphasis on human infertility; clinical case presentation and review utilized whenever possible. Major topics: gametogenesis, *in vivo* gamete manipulation and fertilization, nidation, and selective factors in development. 20 sophomores. Univ. Hosp. (Fall)

395 **Gametogenesis** (1) C. Jacobson

For medical students; open to graduate students with permission of instructor. Seminar course with guest lecturers. Covers various clinical and experimental factors in gametogenesis. Emphasis on histogenesis of the gonads, environmental and clinical variables in infertility. 25 1st-year medical students. Univ. Hosp. (Spring)

399 **Medical Genetics** (1) C. Jacobson

Clinical examples of genetic disease. Emphasis on basic principles such as linkage, heterogenity, mutation, and pedigree inheritance. The goal of the course is to provide the knowledge and skills needed to diagnose, manage, and counsel common genetic disorders. (1972–73 and alternate years: fall)

Ophthalmology

Professor M.F. Armaly *(Chairman)*
Clinical Professors F.D. Costenbader, J.H. King, Jr., L.C. Moss, Benjamin Rones, M.M. Parks, M.G. Alper
Associate Clinical Professors R.W. Wilkinson, B.S. Fine
Assistant Professor D.S. Friendly
Assistant Clinical Professors W.J. Romejko, W.P. Chalfant, Jr., R.E. duPrey, Robert Day, J.H. Lodge, W.B. Glew, J.T. Schwartz, K.A. Simon, H.A. Urweider, B.H. Zeavin, M.O. Ts'o, H.N. Bernstein, D.K. Berler, J.N. Goldman, A.L. Fjordbotten, W.S. Gilbert, H.S. Wicker
Instructors Dertad Manguikian, K.R. Rao, Minoru Araki *(Research)*
Clinical Instructors J.R. Weimer, Stephen Pappas, Joanne Economon, R.S. Deitch, H.I. Rodman, George Liss, H.M. McAllister, L.E. Perraut, Victor Preziosi, H.J. Starr, M.H. Zimmerman, Leonard Kogan, J.F. Nowell, Bernard Ehrlich, D.L. Lanter, Richard Huberman, P.A. Dorn, Jr., E.M. Zimmerman, Joseph Snyder

281 **Ophthalmic Pathology I** (1) L. Zimmerman

Basic science aspects of diseases of the eye. (Spring)

282 **Ophthalmic Pathology II** (3) L. Zimmerman

Diseases of the eye as revealed by gross and microscopic examination. 8 students. Armed Forces Inst. of Path. (Spring)

284 **Ophthalmic Pathology III** (5) L. Zimmerman

Daily participation in an active service limited to pathology of the eye and its adnexa. Inflammatory, degenerative, and neoplastic diseases comprise the major categories. 1 senior; 4-week elective periods. Armed Forces Inst. of Path. (Spring)

*301 **Ophthalmology** (1) Staff

Basic principles of medical and surgical ophthalmology and neuro-ophthalmology. (Fall)

*302 **Ophthalmology** (OPD)(1) Lodge

Clinical instruction in external examination of the eye; tonometry and funduscopy. Use of ophthalmological instruments. (Fall)

380 **Clinical Ophthalmology** (5) Lodge and Staff

Students will observe all types of eye conditions in ambulatory and hospitalized patients. 3 seniors; 4-week elective periods. Wash. Hosp. Center (December–May)

* Required for medical students.

Orthopaedic Surgery

Professors J.P. Adams *(Chairman)*, H.L. Feffer *(Associate Chairman)*, P.P. Griffin
Clinical Professors J.S. Neviaser, L.T. Peterson
Associate Professor Peter Kenmore
Associate Clinical Professors Charles Keck, R.L. Dow
Assistant Clinical Professors C.W. Metz, Jr., Byron Genner III, G.J. Schonholtz, G.I. Baker, S.H. Eisenberg
Instructor W.P. Fortune
Clinical Instructors Frances Brennecke, H.E. Lane, Jr., K.A. Peterson, L.A. Ottenritter, Ronald Ottenberg, E.L. Radin, H.S. Cattell, A.I. Dobranski *(Anatomy)*, B.P. Vitek, Stanford Lavine, C.T. McCullough, Jr., Richard Conant, Ulla Fortune, J.W. Harvey

*302 **Clinical Clerkship in Orthopaedic Surgery**

Two weeks at either the V.A. or University Hospital.

380 **Orthopaedic Surgery** (5) — Adams and Staff

Rotating program: one week of adult orthopaedics at University Hospital; one week of children's orthopaedics at D.C. General Hospital or Children's Hospital; one week of general orthopaedics at Walter Reed General Hospital or Andrews Air Force Base Hospital. 2 seniors; 4-week elective periods. (December–May)

381 **Orthopaedic Surgery** (5) — Kenmore

Participation in total care program of orthopaedic patients: daily rounds, conferences, seminars. 2 seniors; 4-week elective periods. V.A. Hosp. (December–May)

391 **Extramural Orthopaedic Surgery** (5 to 20) — Adams

By special arrangement of the Chairman of the Department, an extramural elective open to seniors for a period of from 4 to 16 weeks.

Otolaryngology

Associate Clinical Professor J.J. McFarland, Jr. *(Chairman)*
Assistant Clinical Professors J.L. Levine, M.E. Krucoff, R.S. Page, Jr., J.A. Sabri, W.M. Trible, B.M. Webb, R.L. Fields, R.E. Pumphrey, Jr.
Clinical Instructors I.S. Jaffee, R.D. Ralph, H.H.E. Scheidemandel, G.F. Miller, Jr., D.N.F. Fairbanks

380 **Otolaryngology** (5) — McFarland

Care of inpatients and outpatients, diagnosis, and therapy; rounds and conferences. 8 seniors; 4-week elective periods. Wash. Hosp. Center. (December–May)

*Required for medical students. Credit is a part of and is assigned after completion of Surg 304.

Pathology

Professors T.M. Peery *(Chairman)*, W.R. Duryee *(Research—Experimental)*, F.N. Miller, Jr., William Newman, J.C. Smith
Clinical Professors L.E. Zimmerman *(Ophthalmic)*, J.M. Blumberg, E.B. Helwig *(Dermatologic)*, G.H. Reifenstein, N.S. Irey, Robert Sauer *(Comparative)*, Cornelia Hoch-Ligeti
Professorial Lecturers Mary Matthews, P.D. Olch *(History of Medicine)*
Associate Professors W.L. Marsh, Lois Platt *(Cytology)*, Alexander Breslow, F.S. Jannotta
Associate Clinical Professors V.E. Martens, Theodore Winship, R.E. Palmer, W.J. Jaffurs
Assistant Professors S.G. Kent, Suzanne Hammersberg *(Medical Technology)*, B.C. Zook *(Comparative)*
Assistant Clinical Professors W.F. Enos, Marjorie Williams, C.B. Cook, D.R. Parkinson, I.D. Godwin, M.A. Weinberger, Floris Garner *(Comparative)*, Gloria Brennan
Special Lecturer L.C. Johnson

115–16 **Introduction to Medical Science** (1–1) Marsh, Hammersberg, and Staff

Lectures for medical technology students on physiology, pathology, and medicine to accompany Path 119–20. (Academic year—1 hour a week)

117–18 **Principles in Medical Technology** (4–4) Marsh, Hammersberg, and Staff

For medical technology students. Theories, principles, sources of error of methods used in clinical chemistry, clinical bacteriology, serology, hematology, clinical microscopy. (Academic year—4 hours a week)

119–20 **Medical Technology Laboratory** (10–10) Marsh, Hammersberg, and Staff

Rotation through University Hospital pathology laboratories: hematology and urinalysis, 12 weeks; chemistry, 12 weeks; bacteriology and parasitology, 12 weeks; blood bank, 6 weeks; serology, 4 weeks; tissue pathology, 4 weeks. (35 hours a week for 50 weeks)

*†201 **Pathology** (8) Staff

Inflammations, degenerations, malformations, trauma, neoplasms. Pathology of organ systems; correlation with symptoms and physical signs. Gross and microscopic study of diseased tissues. Case studies. (Fall—12 hours a week)

*202 **Diagnostic Conferences** (1) Smith, Gusack

Case studies demonstrating pathologic significance of major clinical symptoms and physical signs. (Spring—1 hour a week)

*203–4 **Clinicopathologic Conferences** (0) Staff

Case histories presented and differential diagnosis discussed; clinical, laboratory, necropsy findings correlated. (Fall and spring during medical clerkship)

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* Required for medical students.
† Open to limited number of graduate students, with permission.

252 **Forensic Pathology and Medical Jurisprudence** (1) Miller

Somatic death, coroner and medical examiner systems, pathology of physical and chemical injuries, medical licensure: the physician-patient relationship and professional liability are discussed. (Spring—1 hour a week)

253 **Medicine in Shakespeare** (1) Miller

Seminars with student and staff presentations covering the plays of William Shakespeare of medical significance. (Spring—1 hour a week)

254 **Medicine in Literature** (1) Miller

Series of discussions with student and staff presentations covering novels, dramas, nonfiction, and poetry of medical significance. (Fall—1 hour a week)

260 **Obstetric and Gynecologic Pathology** (1) Jaffurs

Organ changes in normal and abnormal pregnancy, including both the mother and the fetus. Diseases of female genital system. (Spring—1 hour a week)

*262 **Problems in Experimental Cellular Pathology** (1) Duryee

Cytological and biochemical aspects of cellular function in relation to normal and selected pathological conditions. (Spring—1 hour a week)

264 **Clinicopathologic Discussions** (1) Smith, Jannotta

Formal clinicopathologic conferences alternating with systematic review of autopsied cases from the medical service. Univ. Hosp. (Spring—1 hour a week)

*266 **Comparative Pathology I** (1) Sauer, Zook

Participation in an autopsy service involving wild animals in captivity, comparison of diseases in various animal species with those in man. Limited to 4 students. Path Lab., Nat'l Zoological Park (Spring—four 3-hour sessions)

*271 **Tissue Reactions to Drugs** (1) Irey

Study of the problems involved in recognizing instances of untoward reaction to therapy. Case presentations. (Spring—1 hour a week)

272 **Pathology in Medicine and Surgery** (2) Reifenstein

Survey of current literature, with application of pathology to clinical medicine and surgery. Each student assigned an article a week, for study, written report, and group critique. (Spring—2 hours a week)

274 **Medical Pathology** (2) Staff

Study of cases from the necropsy service at University Hospital, evaluating and interpreting gross and microscopic tissue changes and correlating them with clinical data. (Spring—2 hours a week)

*276 **Seminars in Pathology** (2) Peery and Staff

Conferences on current topics in pathology, conducted by and primarily for residents in pathology. Each student teams up with a resident to prepare and present a seminar on a selected topic. Univ. Hosp. (Spring—2 hours a week)

* Open to limited number of graduate students, with permission

279 **Ophthalmic Pathology I** (1) Zimmerman

Basic science aspects of diseases of the eye. (Spring—1 hour a week

280 **Surgical Pathology I** (4) Newman

Surgical pathology service at University Hospital and Washington Hospital Center. Examining specimens from current surgical cases, correlating with clinical manifestations. Univ. Hosp. and Wash. Hosp. Center (Spring—6 hours a week)

282 **Ophthalmic Pathology II** (3) Zimmerman

Diseases of the eye as revealed by gross and microscopic examination. Concurrent requisite: Path 279. 6 students. Armed Forces Inst. of Path. (Spring—4 hours a week)

*283 **Anatomical Pathology Clerkship** (5 or 10) Staff

Necropsy and surgical pathology service. Prerequisite: Path 201. Graduate students receive 5 semester hours of credit for each 4-week period and may receive up to 30 semester hours of credit for 6 months full-time. (Medical students: 3 seniors; 4- or 8-week elective periods; December–May. Graduate students: fall or spring.)

284 **Ophthalmic Pathology III** (5) Zimmerman

Daily participation in service limited to pathology of the eye and its adnexa. 1 senior; 4-week elective periods. Armed Forces Inst. of Path. (December–May)

285 **Clinical Pathology I** (10) Martens

Selected techniques of clinical chemistry, hematology, bacteriology. Student selects laboratory problem. 4 seniors; 8-week elective period. Wash. Hosp. Center (January 31–March 26)

287 **Clinical Pathology II** (5) Marsh, Kenyon

Techniques in the clinical laboratory and interpretation of results, follow-up studies. 1 senior; 4-week elective periods. Univ. Hosp. (December–May)

288 **Clinical Cytology** (5) Plaff

Evaluation of cytologic smears, chiefly vaginal, as a screening procedure in cancer diagnosis. 1 senior; 4-week elective periods. Warwick Bldg. (December–May)

290 **Clinical and Anatomical Pathology I** (5) Cook

Daily studies of surgical and necropsy pathology, including forensic pathology; clinical pathology projects, including hematology, isotopology, bacteriology. 1 senior; 4-week elective periods. Fairfax Hosp. (December–May)

291 **Experimental Cell Pathology: Cancer Research** (5) Duryee

Experimental animal tumors; tissue culture, histological and cytological techniques, library assignment. 1 senior; 4-week elective periods. Warwick Bldg. (December–May)

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* Open to limited number of graduate students, with permission.

292 **Experimental Pathology: Enzymatic Changes in Human Tissues** (5) Hoch-Ligeti

Distribution and concentration of lactic dehydrogenase, beta glucuronidase, and their isoenzymes in human tissues; limited participation in routine studies in pathology. Room and board furnished. 2 seniors; 4-week elective periods. V.A. Center, Martinsburg, W.Va. (February 28–April 23)

293 **Clinical and Anatomical Pathology II** (5) Palmer

Participation in departmental activities, including clinical, surgical, and autopsy pathology; medico-legal autopsies. 1 senior; 4-week elective periods. Alexandria Hosp. (December–May)

294 **Surgical Pathology II** (5)

Preoperative examination of patients with tumors, pathologic examination of excised lesions; teaching conferences. 2 seniors; 4-week elective periods. Wash. Hosp. Center (December–May)

296 **Surgical Pathology III** (5) Newman

For graduate students. Participation in veterinary pathology service, including wild and domestic animals. Prerequisite: Path 201. Five semester hours of credit for each 4-week period. Students may receive up to 30 semester hours of credit for 6 months full-time. Armed Forces Inst. of Path. (Fall or spring)

296 **Surgical Pathology IV** (5) Newman

Evaluation of surgical specimens and correlation with clinical status of patient, description of gross and microscopic findings on assigned cases. 2 seniors; 4-week elective periods. Univ. Hosp. (December–May)

297 **Dermal Pathology** (5) Helwig

Microscopic conferences, review of current material and study sets. 2 seniors; 4-week elective periods. Armed Forces Inst. of Path. (December–May)

298 **Necropsy Pathology** (5) Jannotta, Breslow

Organ changes in disease, gross and microscopic examinations, preparation of protocols. 2 seniors; 4-week elective periods. Univ. Hosp. (December–May)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Pediatrics

Professors R.S. Lourie *(Psychiatry)*, F.P. Heald, R.H. Parrott *(Acting Chairman)*, Spyros Doxiadis *(Visiting)*, S.L. Leikin, J.C. Houck *(Biochemistry)*, A.M. Margileth *(Associate Chairman)*

Clinical Professors W.S. Anderson, L.E. Hoeck, W.A. Howard, J.A. Washington, Lois Murphy *(Child Development)*, Sydney Ross

Associate Professors L.P. Scott III, Margaret Gutelius, E.V. Soto, Gordon Avery, Wellington Hung, Leon Cytryn *(Psychiatry)*, Dorothy Huntington *(Research—Child Development)*, Rebecca Rieger *(Research—Child Development)* A.F. North, Jr., D.W. Delaney

Associate Clinical Professors T.E. Reichelderfer, William Stark *(Psychiatry)*, S.I. Wolf, A.B. Coleman, Bennett Olshaker *(Psychiatry)*, S.C. Southard, Belinda Straight *(Psychiatry)*

Assistant Professors J.R. Puig, Nasser Movassaghi, C.A. Rigg, W.H. Barter *(Psychiatry)*, L.W. Perry, C.M. Berlin, Jr., L.M. Greenberg *(Psychiatry)*, S.A. Fagen *(Research—Child Development)*, Elsa Greenberg *(Research—Child Development)*, Ann Lodge *(Research—Child Development)*, Lovisa Tatnall *(Research—Child Development)*, H.B. Richardson, Jr., Gloria Eng, G.P. August, E.N. Kraybill, M.W. Werthmann, Jr., C.D. Brandt *(Microbiology)*, H.W. Kim

Assistant Clinical Professors Mabel Grosvenor, R.E. Martin, J.H. Peacock, Jr., Mary Sartwell, C.F. Stiegler, H.G. Clark, Adrian Recinos, Jr., C.R. Webb, G.J. Cohen, Stephen Mourat *(Psychiatry)*, Erwin Friedman *(Psychiatry-Psychology)*, A.J. Modlin, A.E. Marans *(Psychiatry)*, Elma Denham *(Psychiatry)*, M.S. Glatt *(Psychiatry)*, Mary Robinson *(Child Development)*, D.F. McKnew, Jr. *(Psychiatry)*, P.C. Brunschwyler, L.A. Cove *(Psychiatry)*, D.F. Devaris *(Psychiatry)*, Milton Engel *(Psychiatry)*, H.T. Yates, Mary Fox, H.D. Knox, B.H. Ong, H.R. Gold, V.L. Guandolo, J.L. Chamberlain III, Leonard Lefkowitz

Instructors S.I. Granger, Beneta Peacock, Anne Fletcher, Mary Flumerfelt *(Psychiatry)*, Shirley McMahon, D.R. Meers *(Psychiatry)*, S.G. Werner, James Todaro, S.R. Lane, Hiltje Irausquin *(Research—Biochemistry)*, Manoucheh Rokni, Karen Olness, Eduardo Azcarate *(Psychology)*

Clinical Instructors H.H. Diamond, R.H. Mitchell, R.O. Warthen, Emilie Black, R.H. Anderson, W.G. Preisser, Roger Bergstrom, S.Z. Goldblatt, Hilary Millar *(Psychiatry)*, Harold Plotsky *(Psychiatry)*, Jean Lockhart, G.W. Daisley, Jr., Agnes Schweitzer, G.W. Hardman, Jr., Frances Min, Ira Mahdavi, K.G. Kassebaum, H.W. Rice, D.A. Young, George Joseph, F.A. Pedreira, Cecilin Chisholm, S.L. Levin, Thomas Sullivan, R.M. Zakheri, M.L. Feldman, Lillian Osborne *(Psychiatry)*

Lecturer R.F. Hinckley

Special Lecturers G.A. Balfour, J.A. Bottiglione, C.J. Schulte III

*301 **Pediatrics** (2) Margileth and Staff

Prenatal, perinatal, postnatal factors influencing growth and development of the infant. Social, emotional, physical growth of infant and child. (Spring)

* Required for medical students.

*303 **Pediatric Clerkship** (10) Margileth and Staff

Full-time, as part of resident team; ward rounds; work in outpatient department and specialty clinics under staff supervision; child psychiatry and child guidance, lectures, clinical conferences, grand rounds. Children's Hosp. (Annual, continuous 8-week rotation)

375 **Community Child Psychiatry** (10) Engel

The student will function as a junior psychiatric resident participating in a satellite clinic in the comprehensive care program. Experience as a member of an interdisciplinary team; participation in consultation to a community group: seminars and conferences. 2 seniors; 8-week elective periods. Morgan Clinic (December–May)

376 **Pediatric Neurology** (5 or 10) Nelson

Participation in diagnostic and therapeutic studies on inpatients and outpatients. Rounds, conferences, and seminars. 2 seniors; 4- or 8-week elective periods. Children's Hosp. (December–May)

377 **Community Health Development** (5 or 10) Hinckley

Acquaints the student with public health preventive and community medicine as it is conducted by the Health Department of Montgomery County, Maryland. The student will have an opportunity to work in outlying health center satellites, central pediatric specialty clinics, and to become familiar with school health programs and projects. 1 senior; 4- or 8-week elective periods. (December–May)

378 **Care and Evaluation of Children of Drug Abusers** (5) Berlin

Extensive exposure to the drug abuse culture. Weekly clinic for evaluation of children of drug abusers. 1 senior; 4-week elective periods. Children's Hosp. and Univ. Clinic (December–May)

379 **Developmental Neurology** (5) Richardson

Application of developmental neurology to learning problems in young school-aged children. 2 seniors; 4-week elective periods. (December–May)

380 **Clinical Pediatrics** (5) Margileth, Puig

Full-time, as part of resident team; wards, outpatient department, and specialty clinics under staff supervision. Participation in diagnostic studies, therapeutic procedures, rounds, and conferences. 6 seniors; 4-week elective periods. Children's Hosp. (December–May)

381 **Pediatric Allergy** (10) Howard

Introduction to pediatric allergy, clinics and wards, some experience in experimental techniques and preparation of extracts. 1 senior; 8-week elective periods. Children's Hosp. (December–May)

382 **Pediatric Radiology** (5) LoPresti

Diagnostic and therapeutic radiology, diagnostic procedures. 2 seniors; 4-week elective periods. Children's Hosp. (December–May)

384 **Newborn and Premature** (5) Avery, Kraybill, and Staff

Clinical studies in newborn care emphasizing hematologic problems and congenital malformations; daily rounds, conferences, research studies in cytogenetics. 2 seniors; 4-week elective periods. Univ. Hosp. (December–May)

* Required for medical students.

385 **Child Psychiatry** (5) Greenber

Diagnostic and follow-up studies on inpatients and outpatients; rounds conferences, seminars; visits to related community facilities. 2 seniors 4-week elective periods. Hillcrest Children's Center (December–May

386 **Pediatric Hematology** (5) Leikin

Clinical and laboratory studies of infants and children with hematologic disorders; bone marrow examinations. 1 senior; 4-week elective periods Children's Hosp. (December–May)

387 **Clinical Pediatrics** (5) Soto

Care of newborn and children on inpatient basis; diagnostic studies therapy; assigned reading. 2 seniors; 4-week elective periods. Fairfax Hosp. (December–May)

388 **Newborn Medicine** (5) Avery and Staff

Observation and participation in the care of inpatient and outpatient in fants. 1 senior; 4-week elective periods. Children's Hosp. (December– May)

389 **Pediatric Cardiology** (5) Scott, Perry

Physical diagnosis of congenital and acquired heart diseases, interpretatio of electrocardiograms and vectorcardiograms, cardiac catheterizations 2 seniors; 4-week elective periods. Children's Hosp. (December–May

392 **Adolescent Medicine Clerkship** (5 or 10) Rigg, Werner

Study of the normal developmental problems of adolescence. Experience in the medical care of adolescents. 2 seniors; 4- or 8-week elective pe riods. Children's Hosp. (December–May)

396 **Mental Retardation** (5 or 10) Cytryn, Friedman

Diagnostic work-up of mentally retarded children and adolescents. Con ferences, community resources. 2 seniors; 4- or 8-week elective periods (December–May)

397 **Pediatric Intensive Care** (5) Berlin

Patients with acute medical/surgical problems on the intensive care ward will be used as a stimulus for students to learn pediatric pathophysiology Monitor equipment and tests, including electrocardiagram, respirator blood gases, fluids, and electrolytes. 2 seniors; 4-week elective periods Children's Hosp. (December–May)

398 **Comprehensive Care** (5 or 10)

Participating in both sick- and well-child care as it is administered in a comprehensive setting; experience in the multidisciplinary approach; co operative planning with other community agencies. 1 senior; 4- or 8-week elective periods. Children's Hosp. (December–May)

399 **Morgan Clinic** (5) Granger

Participation in an observation of a community clinic operation. 1 senior 4-week elective periods. Morgan Clinic (December–May)

Pharmacology

Professor H.G. Mandel *(Chairman)*
Professorial Lecturers B.B. Brodie, F.E. Hahn
Associate Professors V.H. Cohn, Jr., Paul Mazel, K.S. Kim *(Research)*, S.E. Fabro *(Research)*, W.R. Jondorf *(Research)*, J.A. Straw
Assistant Professors G.A. Hahn *(Research)*, Philip Klubes, Barbara Roth-Schechter
Instructors Glenna Fitzgerald, Sau-Wah Kwan
Special Lecturer D.J. Boullin

*201 **Pharmacology** (8) — Mandel and Staff

Lectures, laboratory, conferences on interaction of drugs and biological systems as a basis for rational therapy of disease. Prerequisite: biochemistry and physiology, or approval of Department. (Fall)

203 **Fundamental Principles of Pharmacology** (2) — Staff

Basic principles of pharmacology, including drug-receptor interactions, structure activity relationships, pharmacokinetics, membrane phenomena, cellular control mechanisms, drug toxicity. (Fall)

215 **Adolescent Drug Abuse: a Program for Educators** (3) — Cohn and Staff

Primarily for school teachers, counselors, and administrators. Multidisciplinary lectures and discussions concerning the physiological and psychological effects of narcotics, central nervous system stimulants and depressants, alcohol, and hallucinogenic and psychedelic drugs; psychosocial factors leading to drug abuse; legal implications of drug abuse; prevention, control, and treatment of drug abuse. (Fall and spring)

252 **Seminar: Clinical Pharmacology** (2) — Fabro

Problems in therapeutics: emphasis on drugs used in treatment of cardiovascular, renal, and hemopoietic diseases. Enrollment limited. (1971–72 and alternate years: spring)

254 **Frontiers in Pharmacology** (1) — Mandel and Staff

For medical and graduate students. Recent advances and fields of research in pharmacology. Most of the material presented by laboratory scientists from neighboring institutions. (Spring)

256 **Molecular Pharmacology** (2) — F. Hahn

For medical and graduate students. Current theory on action of drugs, especially chemotherapeutic agents, at molecular level. Effect of drugs on biosynthetic processes of the cell with respect to DNA, messenger RNA, transfer RNA, ribosomes, protein, cell wall, and intermediary metabolites. Factors which alter action of drugs, such as drug interactions and resistance. (Spring)

258 **Cancer Chemotherapy** (1) — Mandel and Staff

For medical and graduate students. Mechanisms by which drugs inhibit the growth of tumor cells. (1971–72 and alternate years: spring)

*Required for medical students; open to graduate students

259 **Developmental Pharmacology** (1) Fabr

For medical and graduate students. Lectures, seminars, conferences. Ter togenic actions of drugs; pharmacological principles which apply durir prenatal and perinatal development. (1971–72 and alternate years spring)

260 **Endocrine Pharmacology** (1) Kir

For medical and graduate students. Lectures and seminars on recent ac vances in the pharmacology and mechanism of action of various ho mones. (1972–73 and alternate years: spring)

264 **Pharmacological Research** (3) Sta

Metabolism of narcotic and nonnarcotic analgesic agents, metabolism an mechanism of action of antibiotics and anticancer drugs, protein synthesi molecular pharmacology, pharmacogenetics, adaptation in drug metabo lism. 3 sophomores. (Spring—2 half days a week)

267 **Pharmacological Research** (arr.) Staf

For graduate students. Research with staff members. May be repeated once for credit toward a Master of Science degree. (Fall and spring

269 **Pharmacology Seminar** (1) Staf

For graduate students. Recent advances in pharmacology. Content differ each time the course is offered; may be repeated once for credit. (Fal and spring)

272 **Physiological Disposition of Drugs** (3) Cohn

For medical and graduate students. Fate of drugs in biological tissue Absorption, distribution, chemical alteration, excretion of drugs; physical chemical, and biological factors affecting these processes. Limited to 2 students. Prerequisite: Phar 201. (1971–72 and alternate years spring)

275–76 **Advanced Topics in Pharmacology I–II** (1–1) Staff

Lectures and seminars on advances in mechanisms of drug action, phar macology of new drugs, theoretical aspects of pharmacology, laboratory techniques. (1971–72 and alternate years: academic year)

277–78 **Advanced Topics in Pharmacology III–IV** (1–1) Staff

Continuation of Phar 275–76. (1972–73 and alternate years: academic year)

279 **Special Topics in Pharmacology** (arr.) Staff

Selected aspects of drug action. Content differs each time the course is offered; may be repeated once for credit. (Fall and spring)

281 **Physiological Techniques in Pharmacology—Lecture** (2) Mazel, Straw

For medical and graduate students. Physiological techniques for obtaining information on mechanism and site of action of pharmacological agents Limited to 20 students. Phar 281 may be taken without 282. Prerequi site: Phar 201. (1971–72 and alternate years: spring)

282 **Physiological Techniques in Pharmacology—Laboratory** (2) Mazel, Straw

Accompanies Phar 281. Prerequisite: Phar 201. Prerequisite or concur rent registration: Phar 281. (1971–72 and alternate years: spring)

283 **Biochemical Techniques in Pharmacology** (arr.) Cohn

For graduate students. Lectures and laboratory. Theory and practice of modern biochemical techniques applicable to study of metabolic fate and mechanism of action of drugs. Prerequisite: Phar 201. (As arranged)

285 **Readings in Pharmacology** (1) Staff

For medical students. Assigned reading and preparation of report. (Fall and spring)

286 **Research in Pharmacology** (arr.) Staff

For medical students. Participation in experimental studies in pharmacology, particularly bacterial chemotherapy, cancer chemotherapy, or drug metabolism. (Fall and spring)

295 **Reading and Research** (arr.) Staff

Independent study for students preparing for the Master of Science degree. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Physiology

Professors C.S. Tidball *(Chairman)*, R.A. Kenney, Elizabeth Tidball *(Research)*
Professorial Lecturers Leonard Laster, K.R. Coburn
Associate Professor Marie Cassidy
Assistant Professors Elizabeth Stephenson, M.J. Jackson, R.A. Lavine, D.W. Watkins
Special Lecturers L.L. Langley, H.J. Zimmerman

Departmental prerequisite: Phyl 201 or equivalent is prerequisite to all courses in Physiology numbered above 201.

191 **Selected Topics in Human Structure and Function** (3) Kenney

Lecture (2 hours), laboratory (1 hour). Structural and functional basis of physiology. A required course for graduate students who have not had Anat 201 or equivalent. Content of this course is on the undergraduate level; students may receive graduate credit on completion of additional work as prescribed by the instructor. Prerequisite: B Sc 11–12 or equivalent and consent of instructor. Open to Columbian College of Arts and Sciences students only with the approval of the student's major adviser. (Fall)

*201 **Physiology** (8) — Staff

Lecture (8 hours), laboratory (2 hours), conference (1 hour). Cellular, organ system, and applied mammalian physiology. Prerequisite for graduate students: Anat 201 or Phyl 191, or equivalent; Bioc 201 or 221-22 (Bioc 222 may be taken concurrently); or consent of Chairman of Department. Nonmedical students please note that the first meeting of the course occurs one week before the start of University campus classes. Open to Consortium students only with permission of Department Chairman. (Spring)

221 **Seminar** (1) — Stephenson

Staff and student presentations from literature. Present work discussed, experimental design and scientific deduction evaluated. Topics to be announced. Prerequisite: a reading knowledge of French or German. Content differs each time the course is offered; may be repeated for credit. (Fall and spring)

251 **History of Medicine** (1) — E. Tidball

Survey of the great contributors to physiology and medicine in the context of the times in which they lived and worked. (Fall)

252 **Physiological Basis of Sexuality** (1) — C. Tidball

Conference 1 hour a week. Human reproduction, neonatal changes, contraception, sterility; their implications on patient counseling. (Fall)

253 **Clinical Applications of Physiology** (1) — C. Tidball

Conference 1 hour a week. Emphasis on acid-base and fluid-balance physiology and its relation to clinical problems.

256 **Aerospace Physiology** (1) — Coburn

Conference 1 hour a week. Discussion of physiological problems involved in aviation and space technology. (Fall)

261 **Gastrointestinal Physiology** (2) — Staff

Lecture or conference 2 hours a week. Physiological approach to such clinical problems as peptic ulcer, malabsorption, ulcerative colitis, hepatitis, and others. (Fall)

262 **Cardiovascular Physiology** (2) — Kenney

Lecture or conference 2 hours a week. An overview of cardiovascular physiology at an advanced level.

263 **Endocrine Physiology** (2) — Jackson

Lecture or conference 2 hours a week. Basic physiology underlying clinical derangements involving abnormal endocrine function.

264 **Basic Science in Clinical Medicine** (2) — Laster

Conferences on basic and clinical research which have brought new understanding to disease states characterized by inborn errors of metabolism. (Fall)

267 **Renal Physiology** (2) — Kenney

Lecture or conference 2 hours a week. An overview of renal physiology at an advanced level.

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* Required for medical students; open to graduate students.

271 **Electronic Instrumentation** (3) — Lavine

Lecture (2 hours), laboratory (2 hours). Fundamentals of electronics and their application to the measurement of physiological phenomena. Prerequisite: Math 31; Phys 1, 2; and consent of instructor. (Fall)

272 **Mammalian Radiophysiology** (1) — Jackson

Lecture or conference 1 hour a week. Basic physiology of radiation lethality.

273 **Investigative Electron Microscopy** (3) — Cassidy

Lecture (2 hours), laboratory as arranged. Application of electron microscopy to biological investigative studies. Limited enrollment. Prerequisite: Anat 261 or equivalent. Admission by permission of instructor. (Fall)

281 **Experimental Gastrointestinal Physiology** (5) — C. Tidball

2 seniors; 4-week elective periods. School of Medicine (December–May)

282 **Experimental Cellular Physiology** (5) — Cassidy

2 seniors; 4-week elective periods. School of Medicine (December–May)

283 **Experimental Neuroendocrinology** (5) — E. Tidball

2 seniors; 4-week elective periods. School of Medicine (December–May)

286 **Experimental Renal Physiology** (5) — Kenney

2 seniors; 4-week elective periods. School of Medicine (December–May)

287 **Experimental Electron Microscopy** (5 or 10) — Cassidy

2 seniors; 4- or 8-week elective periods. School of Medicine (December–May)

288 **Experimental Muscle Physiology** (5 or 10) — Stephenson

2 seniors; 4- or 8-week elective periods. School of Medicine (December–May)

289 **Experimental Nutrition and Metabolism** (5) — Jackson

2 seniors; 4-week elective periods. School of Medicine (December–May)

290 **Experimental Neurophysiology** (5) — Lavine

2 seniors; 4-week elective periods. School of Medicine. (December–May)

295 **Research** (arr.) — Staff

By special arrangement with individual Staff members. Approximately 4 clock hours in the laboratory for each semester hour credit. Content differs each time course is offered; may be repeated for credit. (Fall and spring)

298 **Comprehensive Physiology** (2) — Staff

Guided review of selected areas of Physiology appropriate to the student's graduate program. This course satisfies the requirements for the Master's Comprehensive Examination, the Field Examination for doctoral students

minoring in Physiology, and Part I of the Cumulative General Examination in Physiology. Prerequisite or concurrent registration: Phyl 221. (Fall)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

396 **Advanced Reading and Research** (2) Staff

Limited to students preparing for the Doctor of Philosophy general examination. Tutorial literature survey of a subfield of Physiology and of pertinent areas of the candidate's minor field. This course satisfies the requirement for Part II of the Cumulative General Examination in Physiology. (Fall and spring)

398 **Development of Dissertation Problem** (2) Staff

Limited to students preparing for the Doctor of Philosophy general examination. Preparation for written and oral presentation of dissertation problem. This course satisfies the requirement for Part III of the Cumulative General Examination in Physiology. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates, May be repeated for credit. (Fall and spring)

Psychiatry

Professors Leon Yochelson *(Chairman)*, J.E. Rankin

Clinical Professors D.C. Cameron, T.D. Noble, Sidney Berman, Morris Kleinerman, M. deG. Ruffin, Norman Taub, Samuel Yochelson *(Criminal Behavior)*, D.L. Bazelon *(Socio-legal Aspects)*, Leon Ferber, P.H. Gray, Paul Chodoff, H.A. Meyersburg, F.N. Waldrop, Stanley Yolles, Harold Weiner *(Experimental Psychology)*, G.C. Salmoiraghi *(Neurophysiology and Neuropharmacology)*, Harvey Resnick, S.N. Kieffer

Professorial Lecturers W.E. Barton, H.D. Lederer

Associate Professors Angelo D'Agostino, H.M. Grigorian

Associate Clinical Professors H.P. Laughlin, M.L. Adland, Anna Todd, I.H. Kaiser, C.T. Bever, David Eden, Margaret Mercer *(Clinical Psychology)*, S.I. Szara *(Psychopharmacology)*, Hans Weil-Malherbe *(Neurochemistry)*, J.G. Rubin, E.S. Fleming, R.M. Greenberg, W.D. Kehne, A.M. Drummond, J.L. Sheridan, E.I. Kushner, J.H. Yacoubian, Jack Durell, John Kafka, H.B. Lehrman, J.T. English, I.H. Marill, Bertram Brown, T.D. Reynolds *(Experimental)*, P.S. Weisberg, Calvin Frederick *(Medical Psychology)*, L.D. Robinson, A.S. Abraham, Joseph Baker

Assistant Professor R.M. Coleman

Assistant Clinical Professors Sarah Tenenblatt, J.B Chassan *(Biostatistics)*, R.A. Rogers, J.A. Farrell, N.C. Rintz, F.G. Hilkert, I.D. Milowe, W.C. Johnson, R.A. Frank, Leslie Schaffer, A.H. Kiracofe, Jr., T.M. Mackenzie, R.N. Butler, J.H. Menetrez, Christine Kehne, M.A. Woodbury, W.H. Young, Jr., J.H. Bouma, B.L. Burris, W.J. Stockton, Spencer Gordon, Jr., Marjorie

Creelman *(Psychophysiology)*, C.C.H. Cullander, D.A. Lanham, J.T. Quattlebaum, W.L. Taylor *(Experimental Psychology)*, D.L. Tippett, Archibald Ward, Jr. *(Sociology)*, W.G. Tompkins, Frances Thomas *(Social Work)*, D.S. Sprague, Roger Peele, S.L. Auster, Gertrude Cotts, Brian Crowley, Margaret Garrett, H.A. Greenberg, H.A. Hoffman, R.A. McElroy, B.P. McKaig, J.M. Post, William Davidson, J.A. Schoettler, Stephen Weissman, Pearl Holly, J.L. Evans, D.D. Cowell, Larry Dizmang, Barton Pakull, C.R. Gray, M.J. Chalick, Geraldine Schaeffer, R.T. Lewit, A.M. Messore, W.F. Weber, R.W. Wadeson, Jr., M.T. Advani, M.R. Haas, Edward Black, J.H.L. Marshall, J.M. Nieder, D.E. Raskin, D.H. Fram, Robert DuPont, Jr.

Instructor J.L. Mabon *(Social Work)*

Clinical Instructors W.H. Dobbs, W.A. Hamman, G.D. Legler, D.G. Lipman, S.A. Savitz, J.W. Voell, W.J. Polk, R.A. Blum

Special Lecturer Julius Hoffman

*301 **Psychiatry in the Practice of Medicine** (4) — L. Yochelson and Staff

Normal personality development, psychopathology, psychosomatic disturbances, medical interviewing. Descriptions and clinical demonstration of psychoses, psychoneuroses, and character disorders with presentation of their causes, courses, and treatment. (Spring)

*302 **Clinical Clerkship** (5) — **Rankin and Staff**

Supervised examination, diagnosis, treatment of outpatients and inpatients at University and St. Elizabeths hospitals; case conferences, seminars on psychiatric referral, "psychiatric" drugs, community resources. Psychiatry in general practice stressed. (Fall and spring)

351 **The Role and Professional Identity of the Physician** (1) — Grigorian, D'Agostino

The class explores the personal and social factors of the role of the physician—the aspect of care, identity—through discussion conducted along group dynamic lines. 12 sophomores. (Fall and spring)

382 **Clinical Psychiatry** (5) — **Waldrop**

Clinical care of patients hospitalized for emotional and mental disturbances. 2 seniors; 4-week elective periods. St. Elizabeths Hosp. (December–May)

383 **Psychiatric Day Care** (10) — Advani

Participation in the evaluation of patients referred for day care and in the various activities and programs in the day care center. Research pertaining to the day care center in its role in the treatment of psychiatric patients. 2 seniors; 8-week elective periods. Psychiatric Inst. of Wash. (December–May)

384 **Geriatric Psychiatry** (5) — **Waldrop**

Care and rehabilitative efforts with elderly inpatients with psychiatric and other incapacities. 1 senior; 4-week elective periods. St. Elizabeths Hosp. (December–May)

* Required for medical students.

385 **Schizophrenic Reactions** (5) Bullard*

Psychotherapy and ward management of schizophrenic patients. 2 seniors; 4-week elective periods. Chestnut Lodge, Rockville, Md. (December–May)

386 **Psychiatric Research** (5) Waldrop

Research programs involving clinical and experimental investigations of human behavior. 2 seniors; 4-week elective periods. St. Elizabeths Hosp. (December–May)

387 **Clinical Psychiatry** (5) Rankin

Care of inpatients and outpatients; diagnostic evaluations; individual and group psychotherapies, somatic therapies. 1 senior; 4-week elective periods. Univ. Hosp. (December–May)

388 **Research: Chronic Patient** (10) Meyersburg

Research into social, anthropological, psychological factors influencing long-term care of patients with chronic diseases. 2 seniors; 8-week elective periods. Univ. Hosp. (December–May)

389 **Day Hospitalization** (5–30) Crowley

Participation in the diagnostic and treatment programs of a separate and independent day hospital designed to prevent and replace full-time psychiatric hospitalization. Research in the area of partial hospitalization. 1 senior; 5 semester hours of credit for each 4-week elective period—students may receive up to 30 semester hours of credit for 6 months full-time. Potomac Foundation for Mental Health (December–May)

390 **Research: Psychiatric Aspects of Criminal Behavior** (5) S. Yochelson

Social, anthropological, psychological factors producing criminal behavior. 2 seniors; 4-week elective periods. St. Elizabeths Hosp. (December–May)

391 **Research: Constitutional Psychiatry** (10) S. Yochelson

Somatotypy, genetics, encephalography, sensory deprivation; emphasis on the criminal. 2 seniors; 8-week elective periods. St. Elizabeths Hosp. (December–May)

392 **Administrative Psychiatry** (5) Waldrop

Apprenticeship to administrator of large public mental hospital. 1 senior; 4-week elective periods. St. Elizabeths Hosp. (December–May)

Radiology

Professor W.W. Stanbro *(Chairman)*
Professorial Lecturer J.M. LoPresti *(Pediatrics)*
Associate Professors C.F. Murphy, W.J. Nelson
Associate Clinical Professors H.J. Kicherer, John Maier, R.M. Caulk, A.C. Wyman, D.B. Sodee *(Nuclear Medicine)*, H.M. Hagen
Assistant Professors Richard Granke, Whei-Rung Fu, D.I. Robbins, V.K. Saini, G.J. Augustin, Massoud Majd-Ardekani, S.J. Kurzbard

* Dr. Bullard is Senior Consultant at Chestnut Lodge, Md.

Assistant Clinical Professors Charlotte Donlan, S.R. Bersack, H.L. Berman, Bela Gondos, J.B. Johnston, Jr. *(Radiobiology)*, Marion Faris, Zeki Erim, G.A. Solack, A.S. Cigtay

Clinical Instructors George Tievsky, U.V. Wilcox II, C.M. Weber, M.A. Thomas, James Burwell, R.D. Cornell

*301 **Radiology** (1) **Staff**

X-ray production, methods of examination, normal and pathological X-ray findings of the various body systems, special studies, introduction to radiation therapy and radioisotopes. (Spring)

380 **Radiology** (5) **Murphy**

Each student works with all department physicians sequentially. Daily film conferences. Each student discusses one diagnostic subject in depth, using films from the teaching file. All attend scheduled department conferences. Each student will spend 4 days in Radiation Therapy as an acting intern. 7 seniors; 4-week elective periods. Univ. Hosp. (December–May)

381 **Diagnostic and Therapeutic Radiology** (5) Schumacher†

Observation in fluoroscopic procedures and participation in film reading sessions; observation of techniques and rationale of radiation therapy. 2 seniors; 4-week elective periods. Wash. Hosp. Center (December–May)

382 **General Radiology** (5) **Kabakeris‡**

Participation with the radiologist in diagnosis and therapy. Study in depth of approved subject. Room and board furnished. 1 senior; 4-week elective periods. V.A. Center, Martinsburg, W.Va. (December–May)

Surgery

Professors Brian Blades, C.T. Klopp *(Cancer)*, G.S. Letterman *(Plastic)*, P.C. Adkins *(Chairman)*, J.G. Randolph *(Pediatrics)*

Clinical Professors W.S. McCune, V.M. Iovine, Alec Horwitz, G.A. Higgins, Jr., E.A. Gould

Associate Professors H.C. Pierpont, T.C. Alford, Don Wenger, J.E. McClenathan, P.E. Shorb, Jr., N.T. Tsangaris, J.A. Dowling, Lawrence Brettschneider, J.R. Lilly

Associate Clinical Professors J.R. Thistlethwaite, D.C. Wherry, Maxine Schurter, S.G. Mead *(Oral)*, C.W. Hughes, J.H. Baugh, N.P.D. Smyth, Leon Gerber, D.H. Glew, Jr.

Assistant Professors Allan Hall, R.P. Altman

Assistant Clinical Professors L.B. Burk, Jr., William Ferguson, J.M. Keshishian, J.J. Weinstein, Isabella Harrison, J.T. Estes, Ernst Bremer, F.B. Brandt, J.W. Canter, J.B. Harrell, N.H. Isaacson, L.R. Perna, S.M. Kirson, Fernando Sacasa *(Oral)*, T.M. Wright, Yeong-Cheol Koh, R.D. Shapiro *(Oral)*, D.L. Morton, F.A. Camp, L.T. Bowles

*Required for medical students
†Dr. Schumacher is with the Washington Hospital Center.
‡Dr. Kabakeris is Radiologist at the V.A. Center, Martinsburg, West Virginia.

Instructors F.B. Liebler, W.P. Tunell, Kathryn Anderson
Clinical Instructors J.F. Conlon *(Oral)*, B.G. Brown, J.H. Sager, Gerard Inguagiato, J.E. Peterson, Charles Rickerich, J.R. McClelland, G.E. White, Sheldon Holen *(Periodontics)*, C.A. Silva, E.R. Lamm, K.S. Latchis, W.D. Moyle, Jr.
Special Lecturer D.F. Lynch *(Oral)*

*301 **Lectures in Surgery** (2) — Staff

*303 **Clinical Clerkship I** (10) — Staff
Eight weeks at University Hospital.

*304 **Clinical Clerkship II** (5) — Staff
Four-week extension of Clinical Clerkship I.

*305 **Emergency Room and Anesthesia** (5) — Staff
Four-week clerkship with experience in University Hospital and Clinic. Seniors.

380 **Advanced General Surgery Clerkship** (5) — Shorb, Tsangaris
Participation in the preoperative and postoperative care of patients. 2 seniors; 4-week elective periods. Univ. Hosp. (December–May)

381 **General Surgery** (5) — Hughes
(Formerly Surg 390 General Surgery IV)
Participation in total patient care—operative procedures on three separate surgical sections and on a peripheral vascular section. Daily ward rounds, weekly grand rounds, conferences, and seminars. Both clinical and basic sciences are available. 6 seniors; 4-week elective periods. Walter Reed Gen. Hosp. (December–May)

382 **General Surgery** (5) — Higgins
(Formerly Surg 391 General Surgery V)
Participation in total care program of surgical patients. Daily rounds, conferences, and seminars. 4 seniors; 4-week elective periods. V.A Hosp. (December–May)

383 **General Surgery** (5) — Thistlethwaite
(Formerly Surg 387 General Surgery III)
Surgery rounds, diagnostic studies, operational experience, preoperative and postoperative care, and seminars. 2 seniors; 4-week elective periods. D.C. Gen. Hosp. (December–May)

384 **Thoracic-Cardiovascular Surgery** (5) — Adkins
Basic principles of research in thoracic, cardiac, or peripheral vascular surgery; assigned reading; experience in clinical and experimental studies. 2 seniors; 4-week elective periods. (December–May)

385 **Head and Neck Surgery** (5) — Klopp
(Formerly Surg 382)
Study of new patients and follow-up of treated cases, minor surgical procedures, observation of operating room procedures, and assigned reading. 1 senior; 4-week elective periods. (December–May)

* Required for medical students.

386 **Pediatric Surgery** (5) — **Randolph**
(Formerly Surg 394)

Participation in an active, closely-supervised surgical service for infants and children: includes congenital defects, cardiac surgery, trauma, and neoplasms. Diagnostic studies, preoperative and postoperative care, and operating room procedures. 3 seniors; 4-week elective periods. Children's Hosp. (December–May)

387 **Plastic Surgery** (5) — **Letterman**
(Formerly Surg 389)

Basic aspects of plastic and reconstructive surgery. 2 seniors; 4-week elective periods. (December–May)

388 **Extramural Surgical Electives** (arr.)

The Department arranges for selected students to spend a specified period of time at other institutions.

389 **Surgical Preceptorship** (5) — Iovine, McCune, Thistlethwaite

Participation in general care of surgical patients in an office setting. 3 seniors; 4-week elective periods. (December–May)

399 **Disaster Medicine** (1) — **Pierpont**

Lectures and demonstrations showing management of mass casualties resulting from natural and unusual causes, including the effects of biologic warfare and nuclear explosions. Sophomores. (Fall)

Urology

Professors L.R. Culbertson, F.C. Derrick, Jr. *(Chairman)*
Clinical Professors E.E. Ferguson, W.D. Jarman
Associate Clinical Professor F.T. Reuter
Assistant Clinical Professors Gilbert Ottenberg, G.R. MacDonald, H.A. Goldberg, W.D. Oldham, R.C. Rhame
Clinical Instructors H.D. Wolff, Jr., John Kenealy, George Dudas, H.J. Klapproth, R.E. Ware, W.L. Banfield, I.S. Young, Chalon Rodriguez, E.H. Soifer, Hernando Salcedo

380 **Clinical Urology I** (5) — **Reuter**

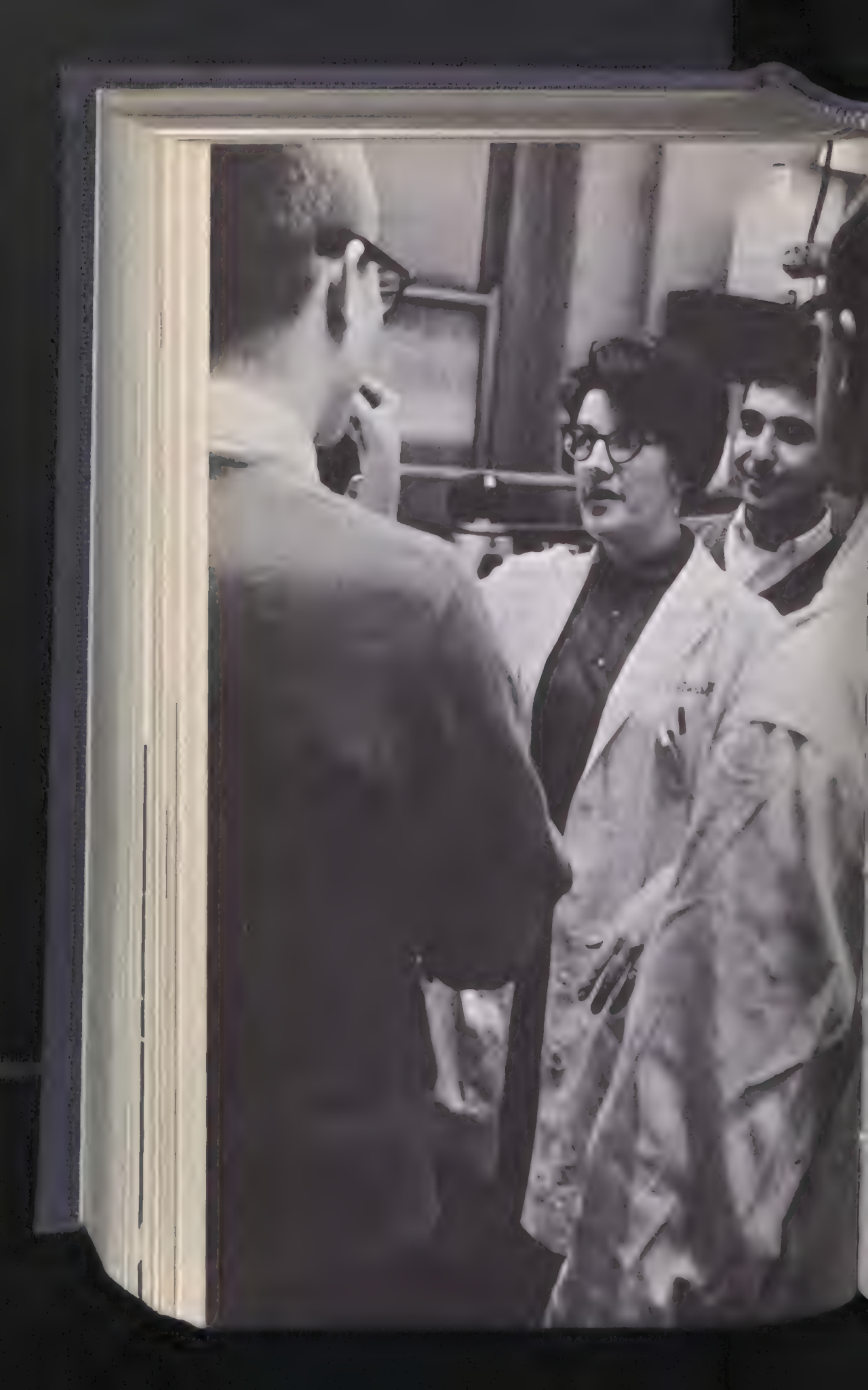
Instruction in outpatient and diagnostic urology, including cystoscopy and radiographic procedures. 1 senior; 4-week elective periods. Univ. Hosp. (December–May)

381 **Clinical Urology II** (5) — **Culbertson**

Observation of urologic conditions and procedures for diagnosis and treatment, radiologic and pathologic studies, endoscopy and surgery, collateral reading, weekly staff conference. 2 seniors; 4-week elective periods. Univ. Hosp. (December–May)

382 **Clinical Urology III** (5) — **Culbertson**

Observation of urologic conditions and procedures for diagnosis and treatment, radiologic and pathologic studies, endoscopy and surgery, collateral reading, weekly staff conference. 2 seniors; 4-week elective periods. V.A. Hosp. (December–May)



THE UNIVERSITY

HISTORY AND ORGANIZATION

THE GEORGE WASHINGTON UNIVERSITY had its beginning in 1821 as The Columbian College in the District of Columbia. The name of the institution was changed in 1873 to Columbian University and in 1904 to The George Washington University. The debt of the University to George Washington, whose name it bears, is an intangible one.

George Washington, as President and as private citizen, had urgently insisted upon the establishment of a National University in the Federal City. There he hoped that, while being instructed in the arts and sciences, students from all parts of the country would acquire the habits of good citizenship, throwing off local prejudices and gaining at first hand a knowledge of the practice, as well as the theory, of republican government. To further the materialization of his hopes, Washington left a bequest of fifty shares of The Potomac Company "towards the endowment of a University to be established within the limits of the District of Columbia, under the auspices of the General Government, if that government should incline to extend a fostering hand towards it." The Congress never extended "a fostering hand." The Potomac Company passed out of existence, and Washington's bequest became worthless.

Fully conscious of Washington's hopes, but motivated primarily by a great missionary urge and the need for a learned clergy, a group of dedicated ministers and laymen sponsored a movement for the establishment of a college in the District of Columbia. Inspired largely by the zeal and energy of the Reverend Luther Rice, they raised funds for the purchase of a site and petitioned Congress for a charter. After much delay and amendment, Congress granted a charter which was approved by President Monroe on February 9, 1821. To safeguard the College's nonsectarian character it provided "That persons of every religious denomination shall be capable of being elected Trustees; nor shall any person, either as President, Professor, Tutor or pupil, be refused admittance into said College, or denied any of the privileges, immunities, or advantages thereof, for or on account of his sentiments in matters of religion."

During the entire time when the institution was known as Columbian College, its activities were centered on College Hill, a tract of forty-six and a half acres between the present Fourteenth and Fifteenth Streets extending north from Florida Avenue somewhat beyond Columbia Road. The Medical School was located downtown. For the better part of the Columbian University period,

the buildings of the University were situated along H Street between Thirteenth and Fifteenth Streets. The Medical School group still remains there.

During the last half century the University's present plant has been developed in that section of the old First Ward familiarly known as "Foggy Bottom," between Nineteenth and Twenty-fourth Streets, south of Pennsylvania Avenue. Within a few squares are the White House, the Department of the Interior, the State Department, the World Bank, and many other governmental offices and international agencies. The area is not without its reminders of historic interest to the University. President Monroe, who signed the Charter, lived at 2017 Eye Street. The first President of the Board of Trustees, the Reverend Obadiah B. Brown, was for fifty years the pastor of a church at Nineteenth and Eye Streets, and Washington selected Twenty-third and E Streets as the site of the National University he had hoped to see established.

The University as it is now organized consists of Columbian College of Arts and Sciences (undergraduate); the Graduate School of Arts and Sciences; the professional schools, which include the National Law Center and the schools of Medicine, Engineering and Applied Science, Education, Government and Business Administration, and Public and International Affairs; the College of General Studies; the Division of University Students; and the Summer Sessions.

The George Washington University is privately endowed and is governed by a self-perpetuating Board of Trustees of which the president is an ex officio member.

ACADEMIC STATUS

The George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Secondary Schools. The University is on the approved list of the American Association of University Women and is a member of the College Entrance Examination Board. The Department of Chemistry is on the approved list of the American Chemical Society.

The School of Medicine has had continuous approval by the Council on Medical Education of the American Medical Association and the Association of American Medical Colleges. The degree of the School of Medicine is recognized by all State Examining Boards.

THE BOARD OF TRUSTEES 1970–71

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* Nominated by the Alumni.

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Donald C. Cook, B.A., M.B.A., J.D., LL.M., L.H.D., LL.D.
*Harry Filmore Dowling, B.A., M.D., Sc.D.
Harry F. Duncan
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Lloyd Hartman Elliott, M.A., Ed.D., LL.D., *President of the University*, ex officio
Mrs. Katharine Graham, B.A.
Melville Bell Grosvenor, B.S., Sc.D., LL.D.
Richard A. Harrison, B.A., M.A.
Brooks Hays, B.A., J.D., LL.D., L.H.D., D.C.L., D.D., HH.D.
Joseph H. Hirshhorn
Joseph D. Hughes, B.S., J.D., LL.M., LL.D.
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David Matthew Kennedy, LL.B., B.A., LL.D.
*Thaddeus A. Lindner, B.A. in Govt.
Franklin Jerome Lunding, LL.B., LL.D.
Jeremiah Milbank, Jr., B.A., M.B.A.
Godfrey Leon Munter, B.A., LL.B., LL.D.
*Beverly Ann Henry Oliphant, B.S., M.S., M.D.
Thornton W. Owen, B.S. in C.E., B.A.
Sidney Dillon Ripley II, Ph.D., L.H.D., Sc.D.
Orville Findley Rush, J.D., LL.D.
Carleton D. Smith
Charles E. Smith
Douglas Rathbone Smith, B.S.C.
Mark Sullivan, Jr., B.A.
*William Gregg White, B.S. in C.E.
John Johnston Wilson, LL.B.
Watson W. Wise, Ph.B.
Stephen Russell Woodzell, B.S. in E.E.
James Otis Wright, B.S., J.D.

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John Edgar Hoover, LL.M., LL.D., Sc.D., D.C.L.
Alfred Henry Lawson, LL.B., LL.D.
John Keown McKee
Benjamin Mosby McKelway, Litt.D.
Sidney William Souers, B.A., LL.D.
Lewis L. Strauss, Sc.D., LL.D., L.H.D.
Alexander Wetmore, Ph.D., Sc.D.
Lloyd Bennett Wilson

* Nominated by the Alumni.

OFFICERS OF ADMINISTRATION 1969–70

THE UNIVERSITY

Lloyd Hartman Elliott, M.A., Ed.D., LL.D., *President*
Harold Frederick Bright, Ph.D., *Provost and Vice President for Academic Affairs*
Henry William Herzog, B.S., *Vice President and Treasurer*
Seymour Alpert, B.A., M.D., *Vice President for Development*
H. John Cantini, Jr., LL.B., *Vice President for Administration*
William David Johnson, B.S., *Director of the Budget*
Louis Harkey Mayo, B.S., J.S.D., *Vice President for Policy Studies and Special Projects*
William Parkhurst Smith, Jr., B.A., M.B.A., *Vice President for Student Affairs*
Frederick Russell Houser, M.A., *Registrar*
Joseph Young Ruth, B.A., *Director of Admissions*

THE SCHOOL OF MEDICINE AND THE UNIVERSITY HOSPITAL AND CLINIC

John Parks, M.S., M.D., *Dean of the Medical Center*
James Joseph Feffer, B.A., M.D., *Associate Dean of the Medical Center, for Clinical Affairs*
Clarence Alfred Lowe, B.A., Ed.M., *Associate Dean of the Medical Center, for Research*
Frank Nelson Miller, Jr., B.S., M.D., *Associate Dean of the Medical Center, for Student and Curricular Affairs*
Ronald Paul Kaufman, B.S., M.D., *Medical Director of the University Hospital*
Calvin Trexler Klopp, B.A., M.D., *Medical Director of the University Clinic*
Victor Frederick Ludewig, B.S., *Administrator of the University Hospital and Clinic*
Donald Knox Hames, B.S. in B.A., *Budget Officer*



THE SCHOOL OF MEDICINE

Faculty and Staff of Instruction*

EMERITI

Errett Cyril Albritton, *Professor Emeritus of Physiology*
B.A. 1916, University of Missouri; M.D. 1921, Johns Hopkins University

Harry Ford Anderson, *Professor Emeritus of Dermatology and Syphilology*
M.D. 1924, University of Cincinnati

Walter Andrew Bloedorn, *Professor Emeritus of Medicine*
M.D. 1909, Creighton University; B.A. 1915, M.A. 1916, Sc.D. 1948, George Washington University

Dexter Means Bullard, *Professor Emeritus of Clinical Psychiatry*
Ph.B. 1920, Yale University; M.D. 1923, University of Pennsylvania

Henry Lauran Darner, *Professor Emeritus of Clinical Obstetrics and Gynecology*
B.A. 1916, Western Maryland College; M.D. 1920, Johns Hopkins University

Paul Frederick Dickens, *Professor Emeritus of Clinical Medicine*
M.D. 1908, University of Nashville

Clayton Bernard Ethridge, *Professor Emeritus of Medicine*
M.D. 1933, University of Virginia

Hayden Kirby-Smith, *Professor Emeritus of Clinical Dermatology*
B.S. 1927, University of the South; M.D. 1937, George Washington University

Chester Elwood Leese, *Professor Emeritus of Physiology*
B.A. 1922, M.A. 1925, Ph.D. 1930, University of Iowa

Edward Lewis, *Professor Emeritus of Clinical Pediatrics*
M.D. 1918, George Washington University

Preston Alexander McLendon, *Professor Emeritus of Pediatrics*
B.S. 1913, Wake Forest University; M.D. 1915, Columbia University

Daniel Bruce Moffett, *Professor Emeritus of Otolaryngology*
B.A. 1910, University of Richmond; M.D. 1915, University of Maryland

Margaret Mary Nicholson, *Professor Emeritus of Clinical Pediatrics*
B.A. 1922, M.D. 1925, George Washington University

George Nordlinger, *Professor Emeritus of Clinical Obstetrics and Gynecology*
B.A. 1918, M.D. 1922, George Washington University

Leland Wilbur Parr, *Professor Emeritus of Bacteriology*
B.S. 1916, Ph.D. 1923, University of Chicago

*The Faculty and Staff of Instruction listed here and at the head of each department is for the academic year 1970–71.

Herbert Pollack, *Professor Emeritus of Clinical Medicine (Biochemistry)*
B.A. 1925, Washington and Lee University; M.D. 1929, Cornell University; Ph.D. 1933, U
versity of Minnesota

Frederick A. Reuter, *Professor Emeritus of Urology*
M.D. 1916, George Washington University

Ernest Alfred Watson Sheppard, *Professor Emeritus of Clinical Ophthalmolog*
M.D., C.M. 1926, Queens University, Canada

Thomas Carlton Thompson, *Professor Emeritus of Clinical Urology*
B.S. in Med., M.D. 1920, George Washington University

Janet Graeme Travell, *Professor Emeritus of Clinical Medicine*
B.A. 1922, Wellesley College; M.D. 1926, Cornell University

James Winston Watts, *Professor Emeritus of Neurological Surgery*
B.S. 1924, Virginia Military Institute; M.D. 1928, University of Virginia

ACTIVE

Theodore Judson Abernethy, *Associate Clinical Professor of Medicine*
B.S. 1925, Denison University; M.D. 1929, Johns Hopkins University

Abe Samuel Abraham, *Associate Clinical Professor of Psychiatry*
B.S. 1938, Westminster College, Pennsylvania; M.D. 1950, George Washington University

Kristof Abraham, *Clinical Instructor in Neurology*
M.D. 1952, Budapest University, Hungary

Sidney Abraham, *Instructor in Clinical Engineering*
B.S. 1936, City College, New York

Herbert Abramson, *Associate Clinical Professor of Medicine*
B.A. 1924, M.A. 1925, M.D. 1935, George Washington University

John Pletch Adams, *Professor of Orthopaedic Surgery*
B.S. 1943, University of Missouri; M.D. 1945, Washington University

Edward Adelson, *Associate Clinical Professor of Medicine*
B.S. 1943, M.D. 1947, Tufts University

Paul Charles Adkins, *Professor of Surgery*
B.A. 1944, M.D. 1948, Johns Hopkins University

Marvin Leon Adland, *Associate Clinical Professor of Psychiatry*
B.S. 1941, M.D. 1943, University of Chicago

Mohan Teckchand Advani, *Assistant Clinical Professor of Psychiatry*
B.S. 1955, Punjab University, India; M.B., B.S. 1960, Osmani University, India; D.P.M. 1964
Mysore University, India

Lewis Francis Affronti, *Associate Professor of Microbiology*
B.A. 1950, M.A. 1951, State University of New York at Buffalo; Ph.D. 1958, Duke Universit

Cosimo Ajmone Marsan, *Assistant Clinical Professor of Neurology*
M.D. 1942, University of Torino, Italy

Robert Wayne Albers, *Professorial Lecturer in Biochemistry (Brain)*
B.S. 1950, University of Nebraska; Ph.D. 1954, Washington University

Chalom Albert, *Assistant Clinical Professor of Anesthesiology*
B.A. 1949, M.D. 1953, American University of Beirut, Lebanon

Ernest Narinder Albert, *Assistant Professor of Anatomy*
B.S. 1959, High Point College; M.S. 1963, University of Pittsburgh; Ph.D. 1965, Georgetow
University

Solomon Naphtali Albert, *Assistant Clinical Professor of Anesthesiology*
B.A. 1936, M.D. 1940, American University of Beirut, Lebanon

Jousef Al-Doory, *Assistant Professor of Epidemiology and Environmenta*
Health
B.S. 1945, University of Baghdad, Iraq; M.A. 1951, University of Texas at Austin; Ph.D
1954, Louisiana State University

Theodore Crandall Alford, *Associate Professor of Surgery*
B.A. 1944, Haverford College; M.D. 1947, Johns Hopkins University

Frank Duane Allan, *Professor of Anatomy*
B.S. 1947, M.S. 1949, University of Utah; Ph.D. 1954, Louisiana State University

James Curwood Aller, *Associate Professor of Clinical Engineering*
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B.A. 1968, George Washington University
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B.A. 1969, Pennsylvania State University
Henriksen, Gary L. Wash.
B.S. in Phar. 1970, University of Washington
Heron, Howard C., II Md.
B.A. 1970, George Washington University
Hirsch, Florie N.Y.
B.A. 1970, Barnard College
Hobbs, Charles L., III Del.
B.A. 1969, Yale University
Howard, Douglas R. Mass.
B.S. 1970, Brown University
Hsia, David Y. Canada
B.A. 1970, Johns Hopkins University
Isaacson, Paul J. Md.
B.A. 1970, Johns Hopkins University
Jenkins, Roger C., Jr. Calif.
B.S. 1970, University of Washington
Kalu, Uduma O. Nigeria
B.S. 1967, Iowa State University of Science and Technology
M.S. 1969, Howard University
Kaplan, Jack O. N.Y.
B.S. 1970, George Washington University
Kass, Frederic H., III N.J.
B.A. 1970, Colgate University
Kelly, Gregory B. Conn.
B.S. 1970, University of Maryland
Kennedy, James J. Md.
B.A. 1969, Duke University
Kerr, Vicky E. S.C.
B.A. 1970, Boston University
Kestenbaum, David J. N.Y.
B.A. 1970, Hofstra University
Kirchner, Nancy A. Ind.
B.S. 1968, University of Maryland
Kutcher, Leslie M. N.Y.
B.S. 1970, Brooklyn College
Laney, Steven R. Wash.
B.S. 1970, University of Washington
Lau, Mark M. Calif.
B.A. 1970, University of California, Berkeley
Lieberman, Jeffrey A. Ohio
B.A. 1970, Miami University
London, David B. Nev.
B.A. 1970, George Washington University
Ludlow, Paul C. Calif.
B.S. 1970, Brigham Young University
Maher, Stephen C. Wash.
B.S. 1970, University of Notre Dame
Manart, Frank D. Calif.
B.A. 1969, University of Southern California
Mangiaracina, Thomas A. N.Y.
B.A. 1970, New York University
Marks, William A. N.Y.
B.A. 1969, St. Lawrence University
McCormick, Joseph P. N.Y.
B.A. 1969, Alfred University
McIntyre, Robert C. Wash.
B.S. 1969, Washington State University
Miller, Robert E. N.Y.
B.A. 1970, Hofstra University
Murray, Ives P. N.Y.
B.A. 1969, University of Colorado
Newman, Robert E. Md.
B.A. 1970, Lafayette College
Nguyen, Levan N.C.
B.S. 1970, Methodist College
Noguchi, Philip D. Calif.
B.A. 1970, University of California, Berkeley
Pagano, Samuel W. N.J.
B.A. 1970, Johns Hopkins University
Passeri, Ronald L. N.J.
B.A. 1970, Rutgers University
Paves, William C. N.Y.
B.S. 1970, Syracuse University
Piccario, Joyce E. Pa.
B.A. 1970, Hood College
Poole, Robert W. Md.
B.S. 1970, Dickinson College
Principi, Kathy L. Ohio
B.A. 1970, Rutgers University
Rabinowitz, Asher D. D.C.
B.A. 1970, Yeshiva University
Radice, Peter A. Md.
B.A. 1970, Yale University
Rogge, Janet L. Wash.
B.A. 1970, University of Washington
Ross, Gary S. N.Y.
B.A. 1970, Colgate University
Ruby, Jo-Anne B. D.C.
B.S. 1967, M.S. 1970, George Washington University
Sacks, Maury E. N.Y.
B.A. 1970, Lehigh University
Sarafan, Peter M. N.Y.
B.A. 1970, Amherst College
Sexton, Robert I. Wash.
B.S. 1970, Gonzaga University
Smith, Alan W. Md.
B.S. 1970, Carson-Newman College
Smith, Kenneth R. Fla.
Attended Florida Atlantic University
Soper, Warren Y., Jr. Canada
B.A. 1970, Sir George Williams University, Canada
Starke, Peter R. N.Y.
B.A. 1970, Trinity College, Conn.
Sternburg, Jon K. Md.
B.A. 1970, Bowdoin College
Stewart, Richard C. D.C.
B.A. 1964, University of Pennsylvania
Taylor, Paul R. Utah
B.A. 1970, Weber State College
Thomas, Katherine L. Ariz.
Attended University of Arkansas
Thompson, John M. Tenn.
B.S. 1970, Florida Southern University
Thomson, John W. Utah
B.S. 1970, Brigham Young University
Tievsky, Andrew L. Md.
B.A. 1970, University of Rochester
Trued, Sally J. D.C.
B.A. 1970, Northwestern University
Valk, Thomas H. Del.
B.S. 1969, Harvey Mudd College
Van Atta, Glen B., Jr. Ohio
B.A. 1965, Ohio Northern University
Van Brakle, John D. Pa.
B.S. 1970, Muhlenberg College
Vangrov, Mark S. Ohio
B.A. 1970, Miami University
Van Osdel, Lewis A., III Md.
B.A. 1968, University of Washington
Werner, Christopher S. D.C.
B.A. 1969, Dickinson College
Whitfield, Peter W. R.I.
B.A. 1969, University of Rhode Island

Wisotsky, Philip — Md.
B.A. 1970, Boston University
Yimoyines, Dean J. — Conn.
B.A. 1969, Syracuse University
Zagorski, Joseph B. — N.J.
B.A. 1969, University of Pennsylvania

SECOND YEAR

Adams, Elizabeth G. — Mass.
B.A. 1966, Wellesley College
Adkins, James W. — Conn.
B.A. 1969, Wesleyan University
Bader, Robert F. — Calif.
B.A. 1969, University of California, Los Angeles
Banis, Joseph C. — Calif.
B.S. 1969, Loyola University of Los Angeles
Barbiere, Charles F. — N.Y.
B.A. 1969, New York University
Bass, Bernard N. — Mass.
B.A. 1969, George Washington University
Bentley, Wendell J. — Utah
B.S. 1970, University of Utah
Bishop, Norman R. — Md.
B.S. 1969, George Washington University
Bobrow, Nathan M. — Md.
Attended George Washington University
Bogran, Luis — Honduras
B.S. 1968, George Washington University
Bollinger, Bruce C. — Colo.
B.S. 1969, George Washington University
Boxall, David W. — Wis.
B.Arch. 1968, Carnegie-Mellon University
Boyd, Richard B. — Mass.
Attended Boston University
Brantner, Brian D. — Calif.
B.A. 1968, California Lutheran College
Broughton, Warren L. — Md.
B.A. 1970, George Washington University
Burstein, Darrell H. — Conn.
B.S. 1969, Trinity College, Conn.
Callihan, Thomas R. — Ohio
B.A. 1969, Kenyon College
Ceder, Lenart C. — Wash.
B.A. 1969, University of Washington
Chase, William D., Jr. — Mich.
B.A. 1969, University of Michigan
Colt, Alan S. — Texas
B.A. 1969, Colby College
Cooper, Wayne D. — N.J.
B.A. 1969, Alfred University
Creswell, Dianne — Md
B.A. 1968, Muskingum College
Cricco, Robert P. — N.J.
B.S. 1969, Fairfield University
Crock, Thomas R. — Pa.
B.A. 1969, Johns Hopkins University
Curfman, David R. — Ohio
B.A. 1965, Columbia Union College
M.S. 1967, George Washington University
Defranzo, Anthony J. — Conn.
B.S. 1969, Trinity College, Conn.
Earls, Stephen T. — Mass.
B.A. 1970, George Washington University
Ehrlich, Dion R. — N.Y.
B.A. 1969, Franklin and Marshall College
Feller, Patricia A. — N.J.
B.A. 1969, Rutgers University
Fiachetti, Frank L. — N.Y.
B.S. 1969, Muhlenberg College
Frist, Brian S. — N.Y.
B.S. 1969, American University
Funt, Loren S. — Fla.
Attended George Washington University
Gersh, Elliot S. — Ohio
B.S. 1969, Ohio State University
Gladstein, Geoffrey S. — Conn.
B.A. 1969, University of Connecticut
Goldklang, Gerald A. — N.J.
B.A. 1969, Boston University
Gray, William C. — Md.
B.S. 1969, University of Maryand
Hanowell, Ernest D. — Calif.
B.S. 1969, University of California, Davis
Harris, Jeffrey D. — N.Y.
B.A. 1968, Hofstra University
Hauptman, Alexander O. — N.J.
B.A. 1967, American University
Heller, Joel H. — N.J.
B.S., B.Phar. 1968, Rutgers University
Hsieh, Robert C. — D.C.
B.S. 1969, George Washington University
Hunter, Bruce C. — Utah
B.S. 1969, Weber State College
Isaacs, Steven E. — N.Y.
B.S. 1967, St. Lawrence University
Javerbaum, Jeffrey S. — N.J.
B.A. 1969, Cornell University
Johnson, Mark Y. — Wash.
B.S. 1969, University of Washington
Kaires, Pamela A. — N.Y.
B.S. 1969, State University of New York at Stony Brook
Kanda, Mireille B. — Haiti
B.S. 1969, American University
Kerns, Scott E. — Mich.
B.S. 1969, University of Michigan
Kohl, Cheryl A. — N.J.
B.A. 1969, Duke University
Kolb, Garry R. — Calif.
B.S. 1968, California State Polytechnic College, San Luis Obispo
Krakovitz, Robert W. — Pa.
B.A. 1969, Pennsylvania State University
Kuhn, Kerry L. — N.Y.
B.A. 1970, George Washington University
Leeper, Willard S. — Calif.
B.S. 1970, Brigham Young University
Levin, Ronald H. — Conn.
B.A. 1969, Clark University
Lewin, Alan A. — N.J.
B.A. 1969, Temple University
Lewis, Allan J. — Ariz.
B.B.A. 1949, Texas Tech University
Lewis, David G. — Utah
B.S. 1969, University of Utah
Lipsett, Nathan W. — N.J.
B.A. 1969, Kenyon College
Liverett, David M. — Md.
B.A. 1969, University of Virginia
Luria, Alan S. — Fla.
B.A. 1969, University of Michigan
Mangan, Kenneth F. — Mass.
B.S. 1969, University of Massachusetts

Manley, Michael D. Calif.
B.A. 1967, M.A. 1970, Sacramento State College

Margules, Edward R. Calif.
B.A. 1968, University of California, Los Angeles

Mugmon, Marc A. Md.
Attended Georgetown University

Mule, Salvatore Conn.
B.A. 1969, University of Connecticut

Myles, Courtland L. D.C.
B.S. 1968, American University

Partlow, Kenneth L. Wash.
Attended University of Washington

Paszek, Michael J. Conn.
B.S. 1969, Trinity College, Conn.

Pechan, B. Warren N.Y.
B.A. 1969, Cornell University

Penhos, Juan C. Argentina
B.A. 1970, George Washington University

Peters, John R. N.Y.
B.A. 1969, New York University

Powell, Richard M. Pa.
B.A. 1968, Temple University

Prioleau, George R., Jr. S.C.
B.S. 1969, South Carolina State College

Ripley, Robert C. Calif.
B.A. 1968, University of California, Berkeley

Romano, John F. N.Y.
B.S. 1969, St. Peter's College, N.J.

Rosenthal, Jesse S. N.Y.
B.A. 1969, George Washington University

Ross, Stuart E. D.C.
B.A. 1969, University of Pennsylvania

Rumsey, Eugene W. Calif.
B.A. 1969, San Diego State College

Saffer, Jeffrey M. N.J.
B.A. 1969, Dartmouth College

Scalettar, Robert E. N.Y.
B.A. 1969, University of Wisconsin

Schade, Robert R. N.Y.
B.A. 1969, Colgate University

Schliftman, Ronald C. N.Y.
B.A. 1969, George Washington University

Siemers, Paul T. Ill.
B.S. 1968, University of Illinois

Silverman, Eugene D. D.C.
B.A. 1970, George Washington University

Smith, Lois F. Va.
B.S. 1969, Dickinson College

Smolansky, Stephen J. N.Y.
B.A. 1969, Temple University

Soben, Arthur L. N.J.
B.A. 1969, Rutgers University

Sokol, Scott K. N.Y.
B.A. 1969, Syracuse University

Spero, Charles R. N.Y.
B.S. 1969, Columbia University

Stang, Howard D. N.J.
B.A. 1969, Rutgers University

Stewart, Barry C. Wash.
B.A. in B.A. 1962, University of Washington

Sullivan, Timothy P. N.J.
B.S. 1969, St. Peter's College, N.J.

Sutton, Frederick J. Md.
B.A. 1969, Cornell University

Sveda, Sally A. Conn.
B.A. 1965, Smith College
M.S. 1967, Yale University

Sweet, Ronald C. Ohio
B.S. 1969, Wright State University

Tamagna, Ellen I. Md.
B.A. 1969, Goucher College

Thistlethwaite, Susan J. Md.
B.A. 1969, Lycoming College

Thomas, Thomas, Jr. Pa.
B.A. 1967, M.S. 1969, Pennsylvania State University

Travers, Charles K., Jr. Md.
B.S. 1969, University of Maryland

Tvedt, Robert A. Conn.
B.A. 1969, Stanford University

Uman, Howard M. Mass.
B.A. 1969, Amherst College

Van de Water, Donald T. Fla.
B.S. 1969, George Washington University

Van der Werf, Joseph N. Pa.
B.A. 1969, Duke University

Van Meter, Keith Wash.
B.A. 1963, Miami University

Villarreal, Fernando A. Mexico
B.A. 1970, George Washington University

Webb, David W. Md.
B.S. 1969, University of Maryland

Wex, Timothy G. Wis.
B.A. 1969, Johns Hopkins University

Wilkenfeld, Morris N.J.
B.A. 1969, Lafayette College

Wilson, Douglas D. Ohio
B.S. 1969, Wright State University

Wilson, Stephen C. Calif.
B.S. 1969, University of Southern California

Wright, Kenneth J. Conn.
B.S. 1969, Trinity College, Conn.

Yates, Anthony P. Pa.
B.A. 1969, St. Vincent College, Pa.

Yingling, Kae S. Md.
B.S. 1969, University of Maryland

Zarchy, Thomas M. N.Y.
B.S. 1969, Trinity College, Conn.

THIRD YEAR

Adams, Anthony W. Va.
B.S. 1968, Virginia Polytechnic Institute

Alarcon, Pedro A. De Guatemala
B.A. 1968, Harvard University

Althoff, Rodger W. Ohio
B.A. 1968, Kent State University

Ammerman, Bruce J. Md.
B.S. 1969, Case Western Reserve University

Annos, Thomas Del.
B.A. 1968, University of Pennsylvania

Conn.

Apter, Matthew N. Wis.
B.S. 1968, Trinity College, Conn.

Apter, Roy J. Canada
B.A. 1968, University of Wisconsin

Barnard, Margaret E. N.D.
B.S. 1967, Dalhousie University, Canada

Beall, Michael B. N.J.
B.A. 1968, Ohio Wesleyan University

Becker, Stuart A.
B.A. 1968, Lafayette College

Johnson, Steele R. Wash.
B.A. 1966, University of Washington
Joseph, Raymond E. Ohio
B.S. 1968, Ohio State University
Juel, Randolph W. Wash.
B.A. 1968, University of Washington
Kasaan, Stuart S. N.Y.
B.A. 1968, Case Western Reserve University
Katlan, Roberta L. N.Y.
B.S. 1968, Simmons College
Katz, Jeffrey I. N.Y.
B.A. 1968, Clark University
Katzen, Jay E. D.C.
B.A. 1967, George Washington University
Kaufman, Joseph H. N.Y.
B.A. 1963, New York University
Kessler, Michael A. N.J.
B.A. 1968, Rutgers University
Kiessling, Brenda R. Va.
B.A. 1962, Oberlin College
M.A. in Ed. 1964, George Washington University
Kimball, Richard R. Calif.
B.A. 1967, University of California, Riverside
King, Don R. Calif.
B.S. 1968, University of Redlands
King, Joy D. Wash.
B.S. 1968, University of Washington
Kirby, Richard L. Del.
B.A. 1968, University of Delaware
Knudson, Homer E. Va.
B.S. 1968, Brigham Young University
Korengold, George M. Md.
B.A. 1968, University of Pennsylvania
Kravitz, Paul H. N.Y.
B.S. 1968, George Washington University
Krzyzkowski, Michael J. N.J.
B.S. 1968, Wagner College
Leventhal, Stuart P. N.J.
B.S. 1968, University of Pittsburgh
Lichtenstein, Alan K. N.Y.
B.A. 1968, Brooklyn College
Lichtenstein, Jacqueline W. Md.
B.A. 1967, Antioch College
Loube, Julian M. Md.
B.A. 1967, George Washington University
Macht, Steven D. Md.
B.S. 1965, D.D.S. 1969, University of Maryland
Magee, William P., Jr. N.J.
D.D.S. 1969, University of Maryland
Marion, Edward D. N.Y.
B.A. 1969, George Washington University
McCarthy, Patrick J. Md.
B.A. 1968, LaSalle College
McClenathan, James H. Md.
Attended Carnegie-Mellon University
Miyawaki, Edison H. Hawaii
M.S. 1964, Johns Hopkins University
Monteverde, Ronald P. N.Y.
B.S. 1968, St. Peter's College, N.J.
Mowery, James H. Ill.
B.A. 1968, Northwestern University
Nickens, Wayne C. D.C.
B.S. 1968, Howard University
Nierman, Robert S. Mass.
B.A. 1968, Boston University
Noble, Donald E. Md.
B.A. 1968, George Washington University

Bergman, Stuart K. N.J.
B.A. 1968, University of Virginia
Binder, Marc K. Pa.
B.S. 1969, Pennsylvania State University
Bin, Kathleen A. N.J.
B.S. 1968, George Washington University
Blanar, Robert A. Md.
B.S. 1968, George Washington University
Bondell, Steven P. N.Y.
B.S. 1968, City College, New York
Brancaccio, Ronald R. N.Y.
B.S. 1968, Fairfield University
Bransfield, Robert C. N.J.
B.A. 1968, Rutgers University
Briggs, Charles M. Va.
B.A. 1965, University of Pennsylvania
Campbell, Darrell A., Jr. Mich.
B.S. 1968, Michigan State University
Cerruti, Michael A. Calif.
B.A. 1966, University of California, Berkeley
Chapin, Donald C. Md.
B.A. 1968, Tufts University
Cockerham, Elaine L. Mo.
B.A. 1967, Valparaiso University
Cowin, John A. N.Y.
B.A. 1968, Gettysburg College
Craft, J. Carl Utah
B.A. 1968, California Western University
Daines, Stephen P. Utah
Attended Utah State University of Agriculture and Applied Science
Daly, Joseph T. Calif.
B.A. 1967, University of California, Davis
Davis, Christopher J. Calif.
B.S. 1968, Massachusetts Institute of Technology
De Figuerredo, Paul D. Portugal
B.S. 1966, Stanford University
Diaz, Carlos R. Md.
B.A. 1968, Johns Hopkins University
Donaldson, Mary M. Md.
B.A. 1968, Sweet Briar College
Donohue, Dennis J. Md.
B.S. 1966, St. John's University, N.Y.
Ehrlich, Leonard D. N.Y.
B.A. 1968, Hunter College
Eisenbaum, Allan M. N.Y.
B.A. 1969, George Washington University
Elam, Kenneth C. N.J.
B.S. 1968, Muhlenberg College
Exner, John H. Idaho
B.S. 1968, College of Idaho
Fine, Anne Elizabeth H. Calif.
B.A. 1969, George Washington University
Fox, Sherman S. N.J.
B.A. 1968, Johns Hopkins University
Franklin, John M. Wash.
B.S. 1968, University of Washington
Georges, Britton L. Wash.
B.S. 1968, University of Washington
Giannuzzi, Vito A. N.Y.
B.S. 1968, George Washington University
Goldman, Robert L. D.C.
B.A. 1968, University of Pennsylvania
Griffiths, Richard C. Va.
B.S. 1968, Michigan State University
Helfgott, Maxwell A. Md.
B.A. 1968, Grinnell College
Hunter, Robert J. Pa.
B.A. 1968, Franklin and Marshall College

Olds, Corwin A. Calif.
B.S. 1947, U.S. Naval Academy
B.S. in M.E. 1955, M.S. in M.E. 1956, U.S. Naval Postgraduate School

Oliff, Michael N.J.
B.A. 1968, Rutgers University

Orman, Ronald J. Mont.
Attended University of Montana

Parker, Frederick W., III Pa.
B.S. 1968, University of Scranton

Paul, David A. Md.
B.A. 1968, Rutgers University

Pearson, Michael L. Wash.
B.S. 1968, Washington State University

Peck, Dennis F. Wash.
B.A. 1968, University of Washington

Pillsbury, Harold C., III Md.
Attended George Washington University

Powell, Thomas R. N.Y.
B.A. 1968, Boston University

Reff, Richard B. Md.
B.A. 1969, George Washington University

Rotstein, Martha Mass.
B.S. 1968, Simmons College

Schenk, Joseph H. Md.
B.A. 1968, LaSalle College

Scherf, Chrisman G. N.Y.
B.S. 1968, Duke University

Schulz, Robert W. Fla.
Attended George Washington University

Schweitz, Michael C. Md.
B.A. 1969, George Washington University

Seltzer, Shalom D. D.
Attended Tulane University of Louisiana

Shreeve, Thomas I. M.
B.A. 1968, Franklin and Marshall College

Sklaver, Allen R. Conn.
B.A. 1968, Williams College

Snover, Seth W. P.
B.S. 1968, Muhlenberg College

Sonkens, Jerry W. Iowa
B.S. 1967, Brigham Young University

Street, Thomas F. N.J.
B.S. 1968, John Carroll University

Surrey, Mark W. D.C.
B.S. 1968, University of Pittsburgh

Swensen, Laird S. Utah
B.A. 1968, Brigham Young University

Theard, Franz C. Ha.
B.A. 1968, Catholic University of America

Thompson, Charles E., Jr. Wash.
B.A. 1968, University of Washington

Thomson, Stephen T. Utah
B.S. 1968, Brigham Young University

Thornton, Abigail G. D.C.
B.S. 1965, M.S. 1967, George Washington University

Warchol, Richard J. Mass.
B.A. 1967, Millikin University

Winston, David H. N.Y.
B.A. 1968, State University of New York at Binghamton

Zimmerman, Larry G. Colo.
B.S. 1968, Colorado State University

FOURTH YEAR

Abbott, Richard L. N.Y.
B.S. 1967, Tufts University

Adam, George N.Y.
B.A. 1967, New York University

Aldrich, Stephen M. Wash.
B.A. 1967, Whitman College

Allen, Robert J. Utah
B.S. 1967, Brigham Young University

Allgaier, Wayne Va.
B.S. 1967, Brigham Young University

Babcock, Terence L. Md.
B.S. 1967, George Washington University

Barnes, Patricia J. N.J.
B.A. 1966, Gettysburg College

Bikowski, Joseph B., Jr. Md.
B.A. 1967, LaSalle College

Boyd, William D., II Md.
B.S. 1967, University of Maryland

Brancaccio, Michael N.Y.
B.S. 1967, Fairfield University

Brener, George A. Mass.
B.A. 1967, Boston University

Browne, Allen F. Calif.
B.A. 1967, Brown University

Browne, Madonna E. Maine
B.S. 1964, Duke University

Brunt, Roger S. Idaho
B.S. 1967, Brigham Young University

Bush, Frank J. Mass.
B.A. 1967, University of Maine

Carson, Culley C. Conn.
B.S. 1967, Trinity College, Conn.

Chabalko, John J. Pa.
B.S. 1967, Muhlenberg College

Charlton, Brian L. Md.
B.A. 1967, Western Maryland College

Chrisman, Allan K. Md.
B.A. 1967, Lafayette College

Clark, John L. Md.
B.A. 1967, Franklin and Marshall College

Cleary, John B. N.Y.
B.S. 1967, Niagara University

Cleveland, Marcia C. Va.
B.S. 1967, Parsons College

Corr, Charles A. Conn.
B.A. 1967, Wesleyan University

Costa, Jack M. N.J.
B.A. 1967, Gettysburg College

Crawford, Joseph A. N.Y.
B.S. in E.E. 1960, Case Western Reserve University
M.S. in E.E. 1964, Columbia University

Crossland, Stanley G. Va.
B.S. 1967, University of Richmond

Dantzig, Paul I. N.Y.
Attended Rensselaer Polytechnic Institute

Darr, David L. N.J.
B.S. 1967, Muhlenberg College

Delmonico, Francis L. N.Y.
B.S. 1966, Mount St. Mary's College, Md.

Dicus, Paul E. Ariz.
Attended University of Arizona

Fine, Paul M. Md.
B.A. 1968, George Washington University

Fitz-Henley, Norman H. N.Y.
Attended City College, New York

Frank, Sidney A. Mass.
B.A. 1967, Bowdoin College

Furlow, Thomas W., Jr. — Md.
B.A. 1968, George Washington University
Gardner, James S. — Mass.
B.S. 1967, Trinity College, Conn.
Garner, Steven C. — Mass.
B.A. 1967, University of Massachusetts
Gens, John P., Jr. — Conn.
B.S. 1967, Trinity College, Conn.
Gerstein, Jared D. — N.Y.
B.A. 1967, New York University
Gibbons, Gary R. — Utah
B.S. 1967, Utah State University of Agriculture and Applied Science
Gibson, Douglas W. — N.Y.
B.S. 1966, Wagner College
Glowitz, Robert J. — Md.
B.S. 1967, University of Maryland
Goldberg, Constance L. — Md.
B.S. 1966, Pennsylvania State University
Goldstein, Howard S. — N.J.
B.A. 1967, Colgate University
Goodman, Clifford J., Jr. — Ariz.
Attended Arizona State University
Gorman, Barry C. — Conn.
B.S. 1967, Tufts University
Greenwood, Mark W. — Utah
B.A. 1967, University of Utah
Gregg, David L. — Calif.
B.A. 1966, Northwestern University
Griffin, Ronald A. — D.C.
B.A. 1967, George Washington University
Grogan, Thomas M. — Va.
B.A. 1967, University of Virginia
Gromet, Michael A. — N.Y.
B.A. 1967, New York University
Gross, Howard J. — N.Y.
B.S. 1967, Tufts University
Hanscom, Jane L. — Maine
B.A. 1967, University of Maine
Harris, Robert J. — Md.
B.A. 1968, George Washington University
Holmes, John S. — Calif.
B.A. 1967, San Fernando Valley State College
James, William S. — N.J.
B.A. 1967, Johns Hopkins University
Jan, Ronald G. — Calif.
B.S. 1965, University of California, Berkeley
Kline, Philip S., Jr. — D.C.
B.A. 1965, University of Texas at Austin
Kuhr, Susan E. — Ohio
B.A. 1967, Yeshiva University
Kurstin, Ronald D. — Texas
B.A. 1967, Tulane University of Louisiana
Lee, Martin — N.Y.
B.A. 1966, Columbia University
Levy, Arnold G. — Del.
B.A. 1968, George Washington University
Lojko, Edwin P. — Mass.
B.A. 1967, University of Virginia
McBeath, John B. — Nev.
Attended San Jose State College
Mendelson, Michael — N.Y.
B.A. 1965, C.W. Post College
M.S. 1967, Rutgers University
Minars, Norman — N.Y.
B.A. 1967, New York University
Moritsugu, Kenneth P. — Hawaii
B.A. 1967, University of Hawaii
Newton, Roger — Tenn.
B.A. 1967, Yale University

Owens, David E. — Pa.
B.A. 1964, Wesleyan University
M.S. 1965, University of Connecticut
Pash, Robert M. — N.J.
B.A. 1967, Gettysburg College
Pett, Stephen D. — N.J.
B.S. 1967, Seton Hall University
Polk, Norman O. — D.C.
B.A. 1967, Harvard University
Potenza, Anthony R. — N.Y.
Attended University of Pittsburgh
Pugatch, Robert D. — N.Y.
B.A. 1967, Johns Hopkins University
Rainey, Edward C. — Nebr.
B.S. 1967, George Washington University
Reed, Barry S. — Wash.
B.A. 1967, University of Washington
Rein, Richard A. — Md.
B.A. 1967, University of Rochester
Reisman, Jerald L. — Ohio
B.S. 1967, University of Michigan
Romig, Bruce — Va.
B.S. 1967, Duke University
Rosenberg, Robert L. — N.J.
B.A. 1968, George Washington University
Ross, David B. — N.Y.
B.S. 1967, Cornell University
Ruben, Richard S. — Pa.
B.A. 1967, Northwestern University
Schlachter, Steven A. — N.J.
B.S. 1967, St. Peter's College, N.J.
Schramm, Melinda M. — Pa.
B.S. 1967, Wheaton College, Ill.
Schulman, Brian M. — N.Y.
B.A. 1968, George Washington University
Schultz, Verna E. — Md.
B.A. 1968, George Washington University
Shapiro, Leslie A. — N.Y.
B.A. 1967, New York University
Smith, Howard N. — N.J.
B.S. 1967, St. Peter's College, N.J.
Sonne, David D. — Calif.
B.S. 1968, University of Utah
Spector, Robert H. — N.Y.
B.A. 1967, Franklin and Marshall College
Starkweather, Roger J. — Va.
B.A. 1967, Northwestern University
Strauss, Barry L. — N.Y.
B.A. 1967, Cornell University
Tan, Edwin C. — Thailand
B.S. 1967, Mount Union College
Tardiff, Jeffrey G. — N.J.
B.A. 1966, St. Michael's College
Tauber, Ira — N.Y.
B.A. 1967, Brooklyn College
Travis, Barbara B. — Md.
B.A. 1967, Bryn Mawr College
Ungar, James R. — N.J.
B.A. 1967, George Washington University
Urrutia-S., Carlos O. — El Salvador
B.S. 1966, Georgetown University
Van Devanter, Stephen H. — Md.
Attended George Washington University
Viener, Robert S. — D.C.
B.A. 1967, University of Pennsylvania
Watt, Albert J. — Ohio
B.A. 1967, Brown University
Weiss, Richard W. — N.Y.
B.A. 1966, Cornell University
Whitley, Richard J. — N.J.
B.A. 1967, Duke University

Woodward, Roger S. Calif.
B.A. 1966, Stanford University
Yip, Larry Wash.
B.S. 1967, University of Washington
Yoder, Paul T.
B.S. 1967, Eastern Mennonite College
Zieminski, John J.
B.S. 1967, Fordham University

Summaries of Registration 1970–71

NUMBER OF REGISTRANTS

Class entering 1970	118	Class entering 1968	10
Class entering 1969	114	Class entering 1967	10

GEOGRAPHICAL DISTRIBUTION OF STUDENTS

Alabama	1	North Dakota	1
Arizona	3	Ohio	12
Arkansas	1	Oregon	1
California	36	Pennsylvania	20
Colorado	4	Rhode Island	1
Connecticut	18	South Carolina	2
Delaware	5	Tennessee	2
District of Columbia	24	Texas	3
Florida	5	Utah	13
Hawaii	2	Virginia	16
Idaho	2	Washington	25
Illinois	2	West Virginia	1
Indiana	2	Wisconsin	4
Iowa	1	Wyoming	1
Maine	2	Argentina	1
Maryland	69	Canada	3
Massachusetts	19	El Salvador	1
Michigan	2	Guatemala	1
Missouri	1	Haiti	2
Montana	1	Honduras	1
Nebraska	1	Mexico	1
Nevada	3	Nigeria	1
New Jersey	48	Portugal	1
New York	78	Thailand	1
North Carolina	1		

INSTITUTIONS IN WHICH SCHOOL OF MEDICINE STUDENTS EARNED DEGREES

Alfred University	2	California Lutheran College	1
American University	4	California State Polytechnic College, San Luis Obispo	1
Amherst College	2	California, University of, Berkeley	2
Antioch College	1	California, University of, Davis	1
Barnard College	1	California, University of, Los Angeles	2
Boston University	6	California, University of, Riverside	1
Bowdoin College	2	California Western University	1
Brigham Young University	11	Carnegie-Mellon University	1
Brooklyn College	3	Carson-Newman College	1
Brown University	3	Case Western Reserve University	3
Bryn Mawr College	1		
C.W. Post College	1		

Catholic University of America	1
Clark University	2
Colby College	2
Colgate University	3
Colorado State University	1
Colorado, University of	2
Columbia-Union College	1
Columbia University	3
Connecticut, University of	3
Cornell University	6
Dalhousie University, Canada	1
Dartmouth College	1
Delaware, University of	1
Dickinson College	3
Duke University	9
Eastern Mennonite College	1
Emory University	1
Fairfield University	4
Florida Southern University	1
Fordham University	1
Franklin and Marshall College	7
George Washington University	52
Georgetown University	2
Gettysburg College	4
Gonzaga University	1
Goucher College	1
Grinnell College	1
Harvard University	1
Harvey Mudd College	3
Hawaii, University of	1
Hofstra University	1
Hood College	3
Howard University	1
Hunter College	2
Idaho, College of	1
Illinois, University of	1
Indiana University	1
Iowa State University of Science and Technology	1
John Carroll University	1
Johns Hopkins University	11
Kent State University	1
Kenyon College	2
Lafayette College	4
LaSalle College	3
Lehigh University	1
Loyola University of Los Angeles	1
Lycoming College	1
Maine, University of	2
Manhattan College	1
Marshall University	1
Maryland, University of	10
Massachusetts Institute of Technology	1
Massachusetts, University of	3
Methodist College	1
Miami University	3
Michigan State University	2
Michigan, University of	4
Millikin University	1
Mount St. Mary's College, Md.	1
Mount Union College	1
Muhlenberg College	6
Muskingum College	1
New York, City College	1
New York, State University of, at Binghamton	1
New York, State University of, at Buffalo	1
New York, State University of, at Stony Brook	1
New York University	10
Niagara University	1
Northwestern University	6
Notre Dame, University of	1
Oberlin College	1
Ohio Northern University	1
Ohio State University	2
Ohio Wesleyan University	1
Oregon, University of	1
Parsons College	1
Pennsylvania State University	5
Pennsylvania, University of	11
Pittsburgh, University of	2
Princeton University	1
Redlands, University of	1
Rhode Island, University of	1
Richmond, University of	1
Rochester, University of	2
Rutgers University	11
Sacramento State College	1
St. John's University, N.Y.	1
St. Lawrence University	2
St. Michael's College	1
St. Peter's College, N.J.	6
St. Vincent College, Pa.	1
San Diego State College	1
San Fernando Valley State College	1
Scranton, University of	1
Seton Hall University	1
Simmons College	2
Sir George Williams University, Canada	1
Smith College	1
South Carolina State College	1
Southern California, University of	2
Stanford University	4
Sweet Briar College	1
Syracuse University	3
Temple University	3
Texas Tech University	1
Texas, University of, at Austin	1
Trinity College, Conn.	10
Tufts University	4

Tulane University of Louisiana.....	1	Weber State College	
U.S. Naval Academy	1	Wellesley College	
U.S. Naval Postgraduate School....	1	Wesleyan University	
Utah State University of Agriculture and Applied Science	1	Western Maryland College	
Utah, University of	4	Wheaton College, Ill.	
Valparaiso University	1	Whitman College	
Virginia Polytechnic Institute.....	1	Williams College	
Virginia, University of	5	Wisconsin, University of	
Wagner College	2	Wright State University	
Washington State University	2	Wyoming, University of	
Washington, University of	20	Yale University	
		Yeshiva University	

Number of college graduates ..... 421 Number of colleges represented .. 150

Recipients of the Degree of Doctor of Medicine, May 31, 1970

Name, State of Residence, Degrees Held	Internship Appointment
Flavius Abiola Akerele, Nigeria B.A. 1966, Boston University	Washington Hospital Center, Washington, D.C.
Jules Richard Altfas, Arizona B.A. 1966, Arizona State University	St. Elizabeths Hospital, Washington, D.C.
Robert Anderson, Jr., Michigan B.S. 1966, Michigan State University	Memorial Hospital of Long Beach, Long Beach, Calif.
Joseph Milo Andrus, Kentucky B.S. 1965, Stanford University	Latter-Day Saints Hospital, Salt Lake City, Utah
Emanuel David Ascarelli, New York B.S. 1966, State University of New York at Albany	U.S. Naval Hospital, San Diego, Calif.
Thomas Edgar Bageant, District of Columbia B.A. 1966, Western Maryland College	Madigan, General Hospital, Tacoma, Wash.
John Andrew Balacki, New York B.S. 1966, Canisius College	G.W. Service, D.C. General Hospital, Washington, D.C.
Sherwood Washington Barefoot, Jr., North Carolina B.A. 1963, Duke University	William A. Shands Teaching Hospital and Clinics, Gainesville, Fla.
Gregory William Benkovic, Connecticut B.A. 1966, Johns Hopkins University	University of Michigan Affiliated Hospitals, Ann Arbor, Mich
Robert Wayne Bonar, Idaho B.S. 1966, College of Idaho	University of California Medical Center, Los Angeles, Calif.
Ronald Calvin Burton, Utah B.S. 1965, University of Utah	U.S. Naval Hospital, Oakland, Calif.
Dennis Lane Canon, New Mexico B.S. 1966, University of Arizona	David Grant U.S. Air Force Center, Fairfield, Calif.
Andrew Anthony Ceavatta, Jr., Pennsylvania B.A. 1966, Franklin and Marshall College	Memorial Hospital of Long Beach, Long Beach, Calif.
Nicholas Anthony Cerimele, Ohio B.S. 1965, University of Pittsburgh	Mercy Hospital, Pittsburgh, Pa.
Donna-Marie Therese Christian, Virgin Islands B.S. 1966, St. Mary's College, Ind.	Presbyterian Pacific Medical Center, San Francisco, Calif.
Leo Joseph Patrick Clark, New Jersey B.S. 1966, University of Notre Dame	State University-Kings County Hospital, Brooklyn, N.Y.
Gerald Fredric Davis, New York B.S. 1966, University of Missouri	Brookdale Hospital Center, Brooklyn, N.Y.
James Ward Delameter, Washington B.A. 1966, University of Washington	Kaiser Foundation Hospital, San Francisco, Calif.
George Gerald Edwards, California B.A. 1966, San Jose State College	U.S. Naval Hospital, Oakland, Calif.
Maureen Crittenden Edwards, District of Columbia B.S. 1966, Marquette University	Children's Hospital, Washington, D.C.

John Roy Emmett, Florida B.S. 1965, Georgia Institute of Technology M.S. 1968, Baylor University	Duke University Medical Center, Durham, N.C.
Robert Melvin Fine, Maryland B.A. 1967, George Washington University	Latter-Day Saints Hospital, Salt Lake City, Utah
Gerald Penny Ford, New York B.A. 1965, Brigham Young University	U.S. Public Health Service Hospital, San Francisco, Calif.
Peter Charles Freis, Jr., New Jersey B.S. 1966, St. Peter's College, N.J	New York Medical College, Metropolitan Hospital Center, New York, N.Y.
Henry Francis Gardstein, Jr., New York B.A. 1966, Franklin and Marshall College	Beth Israel Hospital, New York, N.Y.
Robert John Gerety, New Jersey B.A. 1962, Rutgers University	Stanford University Hospital, Palo Alto, Calif.
M.A. 1966, Ph.D. 1967, Stanford University	
Peter R. Gerkin, New Jersey	Meadowbrook Hospital, East Meadow, N.Y.
Jay Stephen Goldberg, New York B.A. 1966, State University of New York at Binghamton	Medical College of Virginia Hospital, Richmond, Va.
Eric Edwin Goranson, Washington B.S. 1966, Washington State University	Marquette Affiliated Hospitals, and Milwaukee County General Hospital, Milwaukee, Wis.
Kathryn Kenders Guyton, New Jersey B.S. 1966, Juniata College	George Washington University Hospital, Washington, D.C.
Charles Richard Hartz, Montana B.A. 1966, Concordia College, Moorhead, Minn.	University of Oklahoma Hospitals and Veterans Administration Hospital, Oklahoma City, Okla.
Robert Gerald Heinze, Maryland B.S. 1965, George Washington University	Washington Hospital Center, Washington, D.C.
S. Paul Herndon IV, Georgia B.S. 1966, Georgetown University	Children's Orthopaedic Hospital, Seattle, Wash.
Thomas Edward Higgins, New Jersey B.S. 1966, Fordham University	Greenwich Hospital, Greenwich, Conn.
Malcolm Douglas Hill, California B.S. 1965, Stanford University	Bernalillo County Medical Center, Albuquerque, N.M.
Edward Lloyd Hines, Connecticut D.D.S. 1967, Columbia University	Greenwich Hospital, Greenwich, Conn.
Jack Henry Hirsch, Pennsylvania B.A. 1966, Washington and Jefferson College	University of Michigan Hospital, Ann Arbor, Mich.
Barbara Reddy Hoart, Pennsylvania B.A. 1966, University of Pennsylvania	George Washington University Hospital, Washington, D.C.
John Carl Hoefs, California B.A. 1966, California Lutheran College	George Washington University Hospital, Washington, D.C.
Jon Sigurd Huseby, New Jersey B.A. 1966, Brown University	University of Washington Affiliated Hospitals, Seattle, Wash.
Roger Clark Husted, California B.S. 1966, Brigham Young University	U.S. Army Medical Service Hospital, Letterman General Hospital, San Francisco, Calif.
Taylor Alan Jeppson, Utah B.A. 1966, University of Utah	Latter-Day Saints Hospital, Salt Lake City, Utah
Norman Bruce Jetton, Maryland B.A. 1967, George Washington University	Memorial Hospital of Long Beach, Long Beach, Calif.
Michael Richard Jones, New Jersey B.A. 1966, Franklin and Marshall College	Germantown Dispensary and Hospital, Philadelphia, Pa.
Louis Tahisuaka Kanda, Congo B.A. 1966, University of California, Los Angeles	Washington Hospital Center, Washington, D.C.
John Joseph Katona, New York B.S. 1965, Pennsylvania State University	Royal Victoria Hospital, Montreal, Canada
Wilburn William Lewis Kent, Mississippi B.A. 1966, Johns Hopkins University	Strong Memorial Hospital of the University of Rochester, Rochester, N.Y.
Rodney Bernard Kovick, Montana B.S. 1966, University of Washington	Veterans Administration Center-Wadsworth, Los Angeles, Calif.
Ronald Bruce Lamb, California B.S. 1966, University of Redlands	University of California Medical Center, Los Angeles, Calif.
Charles Edward Law, Jr., Virginia B.S. 1966, George Washington University	Good Samaritan Medical Center, Los Angeles, Calif.
Paul Elwood Lewis II, Maryland B.A. 1966, Johns Hopkins University	U.S. Naval Air Station Hospital, Jacksonville, Fla.
Richard Allan Lewis, New York B.A. 1966, Queens College, N.Y.	North Shore Hospital, Manhasset, N.Y., and Memorial Hospital for Cancer and Allied Diseases, New York, N.Y.
[illegible] Edward Long, Arizona B.S. 1965, University of Arizona	U.S. Naval Hospital, Oakland, Calif.
[illegible]hn William Lyles, Jr., Maryland B.M.E. 1954, Cornell University	Washington Hospital Center, Washington, D.C.

William Stafford Lynch, Ohio B.S. 1966, University of Notre Dame	Cleveland Clinic Hospital, Cleveland, Ohio
Winthrop Sylvester MacLaughlin, Jr., Connecticut B.S. in Phar. 1966, Fordham University	Hartford Hospital, Hartford, Conn.
Warren Clark Marshall II, New Jersey B.S. 1966, Pennsylvania State University	Geisinger Medical Center, Danville, Pa.
Milton James Menchey, California B. A. 1966, San Diego State College	York Hospital, York, Pa.
Malcolm Kent Mewha, Pennsylvania B.A. 1966, University of Pennsylvania	Hartford Hospital, Hartford, Conn.
Paul Dennis Miller, Pennsylvania (With Distinction) B.A. 1965, Gettysburg College M.S. 1966, George Washington University	Strong Memorial Hospital of the University of Rochester, Rochester, N.Y.
Paul Ralph Mitchell, Massachusetts B.S. 1966, University of Massachusetts	Mary Hitchcock Memorial Hospital, Hanover, N.H.
Thomas Eugene Moeser, Maryland B.A. 1967, George Washington University	U.S. Naval Hospital, Portsmouth, Va.
Warren Frederick Muth, New York B.A. 1964, Gettysburg College	U.S. Army Medical Service Hospital, Tripler General Hospital, Honolulu, Hawaii
Fred Gordon Odere, New York B.S. 1966, Carnegie-Mellon University	Duke University Medical Center, Durham, N.C.
Alan Joseph Oram, Pennsylvania B.S. 1966, Mount St. Mary's College, Md.	U.S. Naval Hospital, Philadelphia, Pa.
Robert Clark Osborne, California B.A. 1966, University of California, Los Angeles	U.S. Naval Hospital, Camp Pendleton, Calif.
Robert Clemmer Palmer, New Mexico B.S. 1966, University of New Mexico	University of California Medical Center, Los Angeles, Calif.
John Cheung Pan, Hong Kong B.S. 1966, University of Notre Dame	Brookdale Hospital Center, Brooklyn, N.Y.
Philip Paul, New York B.A. 1964, Brandeis University	Montefiore Hospital and Medical Center, New York, N.Y.
George Cannon Pugsley, Utah B.S. 1966, University of Utah	University of California Medical Center, Los Angeles, Calif.
Burton L. Redd, Texas B.S. 1967, University of Utah	Stanford University Hospital, Palo Alto, Calif.
John Stafford Rogers II, Maryland B.S. 1966, University of Maryland	Washington Hospital Center, Washington, D.C.
Richard Mason Rytting, Utah B.S. 1966, University of Utah	Medical Branch Hospitals, University of Texas, Galveston, Texas
Salvatore Carl Santangelo, Connecticut B.A. 1965, Catholic University of America	Presbyterian University Hospital, Pittsburgh, Pa.
Joseph Boyle Sappington, Maryland B.S. 1965, Georgetown University	University of Maryland Hospital, Baltimore, Md.
Anita Koosman Schnur, New Jersey B.A. 1966, Rutgers University	G.W. Service, Veterans Administration Hospital, Washington, D.C.
Gabriel Frank Sciallis, New Jersey B.A. 1966, Rutgers University	George Washington University Hospital, Washington, D.C.
Samuel Jack Scott, Jr., Virginia (With Distinction) B.S. 1966, George Washington University	G.W. Service, D.C. General Hospital, Washington, D.C.
Marc Robert Segall, New Jersey	U.S. Naval Hospital, San Diego, Calif.
Robert Jay Singer, New Jersey B.S. 1966, Pennsylvania State University	New England Medical Center Hospital, Boston, Mass.
Charles Ira Smith, New York B.S. 1966, Syracuse University	Meadowbrook Hospital, East Meadow, N.Y.
Charles Edward Snyder, West Virginia B.A. 1966, West Virginia University	Brooke General Hospital, San Antonio, Texas
Michael Sandor Sommer, Maryland B.A. 1959, M.A. 1964, George Washington University	U.S. Naval Hospital, Bethesda, Md.
Harold Philip Strunk, Pennsylvania B.A. 1966, Yale University	Reading Hospital, Reading, Pa.
Ralph Toshio Suetsugu, Hawaii B.A. 1966, Johns Hopkins University	Queen's Hospital, Honolulu, Hawaii
Patrick Joseph Sullivan, Florida (With Distinction)	University of Miami Affiliated Hospitals, Jackson Memorial Hospital, Miami, Fla.
Michael Eric Sussman, New Jersey B.A. 1966, Franklin and Marshall College	Kaiser Foundation Hospital, San Francisco, Calif.
Richard Landon Taylor, Jr., Ohio	Cleveland Clinic Hospital, Cleveland, Ohio

Paul Jan Thomas, Maryland
B.S. 1966, University of Maryland
Eric Martin Wagshal, District of Columbia
B.A. 1967, George Washington University
Richard Lavell Ward, Idaho
B.S. 1966, Brigham Young University
Michael DeMonte Washburn, Utah
Victor Peter Wasilauskas, Connecticut
B.S. 1966, Mount St. Mary's College, Md
Melvin Phillip Weinstein, New Jersey
B.A. 1966, Rutgers University
Joseph Daniel Welch, New York
B.A. 1966, Johns Hopkins University
Richard Michael Whalen, Montana
B.S. 1966, Montana State University

John Duane Wojcik, New Jersey
(With Distinction)
B.S. 1966, Georgetown University
Craig Duryea Woodward, New York
B.A. 1966, Johns Hopkins University
Michael Bruce Wooten, Virginia
B.S. 1966, Washington State University

Walter Reed General Hospital, Washington, D.C.
Washington Hospital Center, Washington, D.C.

U.S. Public Health Service Hospital, Baltimore, Md
U.S. Naval Hospital, Oakland, Calif.
Washington Hospital Center, Washington, D.C.

Hartford Hospital, Hartford, Conn.

Rochester General Hospital, Rochester, N.Y.

North Shore Hospital, Manhasset, N.Y., and Memorial Hospital for Cancer and Allied Diseases, New York, N.Y.
Harvard University Service, Boston City Hospital, Boston, Mass

University of Miami Affiliated Hospitals, Jackson Memorial Hospital, Miami, Fla.
University of Arizona Affiliated Hospitals, Tucson Hospitals Medical Education Program, Tucson, Ariz.



APPENDIX: RECENTLY ESTABLISHED REGULATIONS

THE FOLLOWING UNIVERSITY REGULATIONS are under review and may be subject to change in connection with the establishment of judicial processes. Bulletins and handbooks incorporating any changes will be issued as appropriate.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on October 19, 1968:

Whereas, safety and order are essential preconditions of the learning process and indeed of the very concept of a university; and

Whereas, The George Washington University is committed to protection of free speech and freedom of assembly, and to safeguarding the right of lawful protest on campus; and is committed equally to maintaining the peace and safety of the campus, in the knowledge that all rights are in jeopardy when violence and civil disorder prevail over law and reason;

Now, therefore, be it resolved by the Senate of The George Washington University: that in the event a demonstration at this University exceeds the bounds of free assembly and lawful advocacy, and demonstrators are engaging in unlawful acts which cause or imminently threaten injury to persons or property or which obstruct or interfere with normal and necessary University activities, this body affirms the authority of the President, or other University officials designated to act in his absence, to take such reasonable steps, if possible after consultation with the Chairman of the Executive Committee of the University Senate and the President of the Student Body, as are required to restore and preserve order; including, if deemed necessary and appropriate, suspension of students or faculty engaging in such acts, and use of such law enforcement personnel as are needed to effect the removal, arrest, and prosecution of law violators. Any such suspension shall be reviewed by an appropriate tribunal as soon after order is restored as is practicably possible.

The following was approved by the University's Board of Trustees on October 19, 1968:

Any student suspended from The George Washington University on the grounds of exceeding the bounds of free assembly and lawful advocacy shall have his suspension reviewed by the Hearing Committee on Student Affairs of The George Washington University as soon after order is restored as is practicably possible.

The following resolution, submitted by the Student Life Committee, was approved by the University's Board of Trustees on October 19, 1968:

Be it resolved that The George Washington University: affirms its traditional commitment to freedom of expression (a) by continuing to permit business and government organizations which are recruiting employees to conduct their activities at designated places on campus, and (b) by placing no obstacle to students who may wish to protest the presence of such recruiters, provided, however, that such protest shall be orderly and shall not impede or disrupt the recruiter in his activities.

The University affirms its place as a forum for the free exchange of ideas (a) by assuring that guests invited to speak on this campus at duly scheduled meetings shall have the right to appear and to be heard, and (b) by sanctioning the freedom of students to express dissent from the views of the speaker, provided, however, that that expression of dissent be orderly and nonobstructive.

The University distinguishes between orderly protest and resistance-by-obstruction; it accepts the former as a legitimate expression of dissent while rejecting the latter as an abridgement of the freedoms of the individuals who may be its object.

The following was approved by the University's Board of Trustees on October 19, 1968:

The George Washington University is opposed to discrimination based on race, color, or creed. Such discrimination may have appeared in campus organizations in the past. In the future, however, no organization can be recognized or supported by the University unless it provides continued assurance of nondiscrimination in membership practices and in intent, considered adequate by relevant committees and officers of the University.

The following was approved by the University's Board of Trustees on October 19, 1968:

The University cannot condone violations of law, including violation of those laws which proscribe possession, use, sale, or distribution of certain drugs. Members of the academic community should know that administrative action, which may include dismissal from the residence halls, revocation of other privileges, or suspension or dismissal from the University, may be taken in order to protect the interests of the University and the rights of others.

The Board of Trustees reaffirms the responsibility of the President and the Faculty to continue to implement this policy.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on January 16, 1969:

Be it resolved by the Senate of The George Washington University: Any member of the University (including as members of the University all persons having a formal connection with the University)

(a) who engages in conduct that unreasonably obstructs teaching, research, and learning, or

(b) who unreasonably obstructs free access to members or guests of the University or to University buildings, or

(c) who disobeys general regulations of the University, or

(d) who damages University property or injures members or guests of the University,

may be punished for his conduct by dismissal from the University, or by some lesser disciplinary action, through procedures established within the University for the government of its members.

In order to insure due process, any student subject to dismissal or other disciplinary action on the grounds of violating any of the premises of this resolution shall have, at his discretion, the right of review of the action by the University Hearing Committee on Student Affairs.

ANNUAL ISSUES OF THE UNIVERSITY BULLETIN

Requests for the following publications must include your zip code and show be addressed as indicated.

COLLEGE OF GENERAL STUDIES, Dean of the College

NATIONAL LAW CENTER, Dean of the Center

SCHOOL OF ENGINEERING AND APPLIED SCIENCE, Dean of the School

UNDERGRADUATE AND GRADUATE CATALOGUE (Arts and Sciences, Educatio Government and Business Administration, Public and International Affair Office of Admissions

SCHOOL OF MEDICINE, Admissions Office, School of Medicine

SUMMER SESSIONS, Dean of the Summer Sessions

SCHEDULE OF CLASSES: FALL AND SPRING SEMESTERS, Registrar

SCHEDULE OF CLASSES: SUMMER SESSIONS, Dean of the Summer Sessions

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COLLEGES AND SCHOOLS—DEGREE PROGRAMS

COLUMBIAN COLLEGE OF ARTS AND SCIENCES: Associate in Arts (A.A.), Bache
lor of Arts (B.A.), Bachelor of General Studies (B.Gen.Std.), Bachelor of Sc
ence (B.S.), Bachelor of Science in Environmental Health (B.S. in Env.Healt
Bachelor of Science in Geodetic and Cartographic Science (B.S. in Geod. an
Cart.Sc.), Bachelor of Science in Medical Technology (B.S. in Med.Tech.), an
Bachelor of Science in Oceanography (B.S. in Ocea.)

GRADUATE SCHOOL OF ARTS AND SCIENCES: Master of Arts (M.A.), Master
Fine Arts (M.F.A.), Master of Music (Mus.M.), Master of Science (M.S
Master of Science for Teachers (M.S. for Teachers), and Doctor of Philosop
(Ph.D.)

SCHOOL OF MEDICINE: Doctor of Medicine (M.D.)

NATIONAL LAW CENTER: Juris Doctor (J.D.), Master of Laws (LL.M.), Mast
of Comparative Law (M.Comp.L.), Master of Comparative Law (Americ
Practice) (M.Comp.L.(Am.Prac.)), and Doctor of Juridical Science (S.J.D

SCHOOL OF ENGINEERING AND APPLIED SCIENCE: Bachelor of Science (Civil E
gineering) (B.S. (C.E.)), Bachelor of Science (Electrical Engineering) (B.
(E.E.)), Bachelor of Science (Measurement Science) (B.S. (Meas.S.)), Bach
lor of Science (Mechanical Engineering) (B.S. (M.E.)), Master of Scienc
(M.S.), Master of Engineering Administration (M.E.A.), and Doctor of S
ence (D.Sc.)

SCHOOL OF EDUCATION: Bachelor of Arts in Education (B.A. in Ed.), Bache
of Science in Physical Education (B.S. in P.E.), Master of Arts in Teach
(M.A.T.), Master of Arts in Education (M.A. in Ed.), Education Specia
(Ed.S.), and Doctor of Education (Ed.D.)

SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION: Bachelor of Busines
Administration (B.B.A.), Bachelor of Science in General Studies (B.S
Gen.Std.), Master of Arts in Government (M.A. in Govt.), Master of A
in Health Care Administration (M.A. in H.C.A.), Master of Business Admin
tration (M.B.A.), Master of Public Administration (M.P.A.), Master of Scien
in Administration (M.S. in Adm.), Master of Urban and Regional Planni
(M. of Urb. and Reg.Plan.), Graduate Certificate in Health Care Administ
tion (Grad.Cert. in H.C.A.), Doctor of Business Administration (D.B.A
and Doctor of Public Administration (D.P.A.)

SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS: Bachelor of Arts (B.A.), Ce
tificate of the Institute for Sino-Soviet Studies (Cert. of I.S.S.S.), Master
Arts (M.A.), and Master of Science in International Affairs (M.S. in I.A.)

THE GEORGE WASHINGTON UNIVERSITY

COLUMBIAN COLLEGE OF ARTS AND SCIENCES, 1821

THE GRADUATE SCHOOL OF ARTS AND SCIENCES, 1893

THE SCHOOL OF MEDICINE, 1825

THE NATIONAL LAW CENTER, 1865

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE, 1884

THE SCHOOL OF EDUCATION, 1907

THE SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION, 1928

THE SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS, 1928

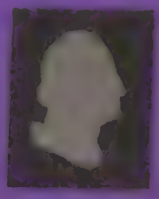
THE COLLEGE OF GENERAL STUDIES, 1950

THE DIVISION OF UNIVERSITY STUDENTS, 1930

THE SUMMER SESSIONS, 1916

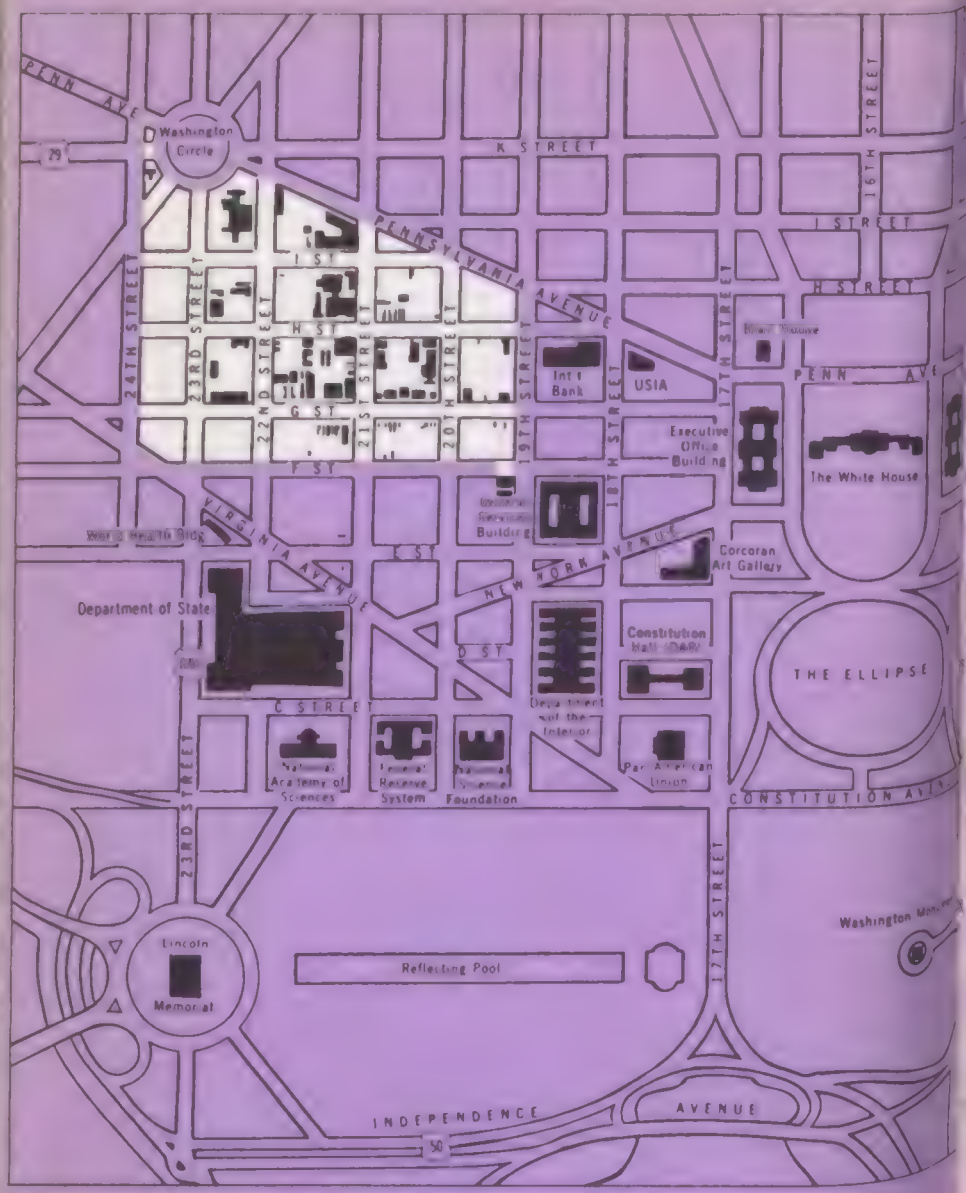
THE UNIVERSITY HOSPITAL, 1898

The George Washington University Bulletin



NATIONAL
LAW
CENTER

1971-1972



WASHINGTON, D.C.

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THE NATIONAL LAW CENTER
1971–1972

WASHINGTON, D.C. 20006



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THE CALENDAR 1971–72

1971 SUMMER TERM

June 7	Registration for all sessions (12 am–7 pm) *Monday*
June 8	First session and 13-week session begin *Tuesday*
July 5	Holiday *Monday*
July 16	First-session classes end *Friday*
**July 19–21*	First-session examination period *Monday-Wednesday*
July 22	Registration for students attending 2d session only (2–7 pm) *Thursday*
July 23	Second-session classes begin *Friday*
September 1	Last day of classes *Wednesday*
September 2–4	Second-session and 13-week session examination period *Thursday–Saturday*

1971–72 FALL SEMESTER

September 7–8	Registration *Tuesday* (10 am–7 pm)–*Wednesday* (3–7 pm) Only students whose last names begin with L through Z may register between 10 am and 1 pm Tuesday; only students whose last names begin with A through K may register between 1 and 4 pm Tuesday. All students may register between 4 and 7 pm Tuesday and on Wednesday Application for February graduation due as part of registration
September 9	Classes begin *Thursday*
September 20	No classes *Monday*
September 29	No classes *Wednesday*
October 8	S.J.D. dissertations of February candidates due *Friday*
November 24	Thanksgiving recess begins after last class *Wednesday*
November 29	Classes resume *Monday*
December 18	Last day of fall-semester classes *Saturday*
January 3	LL.M. theses of February candidates due *Monday*
January 3–15	Examination period *Monday–Saturday*

1972 SPRING SEMESTER

†*January 20–22*	Registration *Thursday–Saturday* Application for June graduation due as part of registration
January 24	Classes begin *Monday*
February 4	S.J.D. dissertations of June candidates due *Friday*
February 21	Winter Convocation (holiday) *Monday*
March 13	Application for 1972–73 teaching fellowships due *Monday*
March 25	Spring recess begins after last class *Saturday*
April 3	Classes resume *Monday*
May 1	LL.M. theses of June candidates due *Monday*
May 5	Last day of spring-semester classes *Friday*
May 6–27	Examination period *Saturday–Saturday*
May 29	Memorial Day (holiday) *Monday*
June 4	Commencement *Sunday*

* Courses in the 13-week session will meet on their regularly scheduled days during the week of July 19.
† Hours of registration to be announced



THE NATIONAL LAW CENTER

HISTORY

THE LAW SCHOOL, the oldest in the District of Columbia, was established in 1865 with a formal program of two years of study. This was largely through the efforts of the Reverend George Whitefield Samson, President of Columbian College, whose action resulted in the purchase of a separate building for holding law classes. This building had belonged to Trinity Church, of which Francis Scott Key had been Senior Warden. It was occupied by the Law School until 1884.

Sixty graduates, from twenty-two of the then thirty-seven states, received degrees in 1867. The School continued to have a student body and a faculty which reflected the fact that it was at the seat of our nation's government. Associate Justices David J. Brewer and John Marshall Harlan of the Supreme Court of the United States were among the prominent members of the bench and bar who served as lecturers.

In 1877, one year after the first such program was adopted in the United States, the Law School instituted a course leading to the degree of Master of Laws. In 1898, the course of instruction for the degree of Bachelor of Laws was extended to three years. The School took part in 1900 in the organization of the Association of American Law Schools. Later, women students were admitted, and in 1916 the first woman to take a regular course in law was graduated.

In the past quarter-century the Law School developed its course and seminar offerings with consideration for the needs of first-degree and graduate students. The degree of Doctor of Juridical Science was instituted in 1940. The needs of foreign lawyers who come to this country and who require additional preparation for law work in the United States resulted in the creation of programs for the degrees of Master of Comparative Law in 1946 and Master of Comparative Law (American Practice) in 1951.

National University, which had had an important place in legal education in the District of Columbia since 1869, was merged in George Washington University in August, 1954.

Programs of special research and study, such as the Government Contracts Program, give richness to the basic curriculum.

The National Law Center, which was established in 1959, seeks to establish and coordinate programs of teaching, research, and creative development in law which will assist the profession to meet the demands placed upon it by

contemporary society. Emphasizing an interdisciplinary approach to modern social, political, scientific, and economic problems having legal implications, the Center also encourages close relations with other appropriate units of the University.

In 1968, the Law Center established the degree of Juris Doctor as its first degree in law.

LOCATION IN THE NATION'S CAPITAL

Of special significance is the location of the National Law Center in the Nation's Capital, the focal point of the law in action, both American and international. The work of the Center goes on in this environment, presenting a unique opportunity for observation and study of federal agencies—judicial, legislative, and administrative. Readily accessible are the Supreme Court of the United States, the federal trial and appellate courts of the District of Columbia, and, in addition, federal courts of special jurisdiction, such as the United States Court of Claims, the United States Court of Customs and Patent Appeals, the Tax Court of the United States, and the Court of Military Appeals. Current federal legislation can be studied as it is considered by Congressional committees and as it comes up for debate on the floors of the House of Representatives and the Senate. With respect to the federal administrative agencies, students here in Washington have matchless opportunities for study and observation. They can attend informal and formal hearings of these agencies and can obtain from the docket sections complete records of administrative adjudication in specific cases. Illustrative of such federal agencies are the Interstate Commerce Commission and the Civil Aeronautics Board in the field of transportation; the Federal Trade Commission in the field of trade regulation; the Securities and Exchange Commission in the field of security issues and corporate finance; the National Labor Relations Board in the field of labor-management relations; the United States Patent Office in the field of patent law; the Federal Power Commission in the field of water, natural gas, and electric power; and the Federal Communications Commission in the field of radio and television.

Supplementing these environmental advantages of law in action are the exceptional research library collections in the Library of Congress, in the various departments of the Federal Government, and in the libraries of the headquarters of national and international organizations. The notable library of the Carnegie Foundation for International Peace has been acquired by George Washington University for use of research students in international and comparative law, fields with respect to which Washington has come to be called "The Capital of the World."

The years of residence at law school are years of participation in the life of the community, which in the case of the George Washington University National Law Center is the government of the United States. As a consequence, the study of law takes on added meaning, whether the goal be government service or practice, general or specialized, and whatever the community in which the student plans to practice.

OBJECTIVES

The primary purpose of the Center is to prepare men and women to meet the needs of society in the many fields of law, public and private. These needs call

not only for technical skill but also for responsible leadership in the development of the law and the administration of justice. In fulfilling these responsibilities the Center conducts (1) a program of study in preparation for the practice of law, whether it be general practice, specialized practice, or government service; (2) the publication of a law journal containing the results of research in public law; (3) a series of student professional co-curricular activities; (4) study and research on an advanced level for foreign as well as for American students; and (5) a continuing legal education program for members of the bar.

Juris Doctor Program

THE WIDE GEOGRAPHIC DISTRIBUTION of the students who come to the Nation's Capital to study law makes this a truly national law school. Students from almost every state in the Union here join students from several foreign countries in their legal training. Last year over 400 colleges and universities were represented. The basic curriculum leading to the Juris Doctor degree is addressed to the development and application of legal principles, skills, and ideals which are indispensable to the equipment of a lawyer for professional responsibility and leadership in modern society. It includes, first and foremost, the traditional core of legal education, namely, the study of legal materials—judicial, statutory, and administrative—and instruction in the understanding and technique of their use. It also includes the study of the nature and purpose of law, the history of the Anglo-American legal system, and the history and standards of the legal profession; practice in the skills of legal research and legal writing; elementary training in trial and appellate practice; and, through the medium of seminars, experience in group handling of legal problems.

ENTERING CLASSES

The curriculum is organized so that students may begin the study of law for the Juris Doctor degree only at the start of the fall semester. Transfer students may enter at the start of the spring semester also.

ENTRANCE REQUIREMENTS

Admission to candidacy for the degree of Juris Doctor requires a Bachelor of Arts or equivalent degree from an accredited college or university, a satisfactory quality of work, and an acceptable distribution of courses. Eligibility is based on personal and scholastic records and on the result of the Law School Admission Test. No applicant will be acceptable in transfer who is ineligible to return in good standing to a previously attended law school. From the applicants, a selection is made by the Committee on Admissions.

Information concerning the Law School Admission Test may be obtained from the Dean of the National Law Center or from the Educational Testing Service, 20 Nassau Street, Princeton, N.J. 08540; or 1947 Center Street, Berkeley, Calif. 94704. The test is administered at various centers in the United States. It is anticipated that the testing dates for 1971–72 will be in October, December, February, April, and July. Completed application blanks and fees

must be received by the Educational Testing Service at least two weeks before the date of the test. It is not necessary that formal application for admission be made prior to taking the test.

ADVANCED STANDING

Advanced standing toward the degree of Juris Doctor may be granted for work successfully completed in other law schools which are members of the Association of American Law Schools or are approved by the American Bar Association. Transferred credits will not be recognized in excess of those which might be earned in a similar period in the National Law Center.

Advanced standing will not be granted for law work already counted toward the Bachelor of Arts or other pre-legal degree.

TUITION DEPOSIT

Every student admitted to the National Law Center as a candidate for the degree of Juris Doctor must submit a $100 tuition deposit after receipt of notification of acceptance. This deposit is credited toward tuition and is refundable in full only in cases of applicants called into military service; $50 will be refunded if notification is received by July 1 that the student does not intend to enter in the fall, $20 will be refunded if notification is received by September 1.

REQUIREMENTS FOR THE DEGREE

The student must have completed a residence period of three academic years (four years for evening students) and 84 semester hours of required and elective courses, with a cumulative average of at least 65. At least one academic year of residence and 28 semester hours are required of students admitted with advanced standing. The work of the final semester or summer session must be completed while in residence at the National Law Center. Credits allowed by way of advanced standing are not included in computing the average required for graduation.

Graduation Requirements.—See page 38 for a statement of the graduation requirements.

HONORS

The degree of Juris Doctor "With Honors" is awarded students who obtain a minimum cumulative average of 75 but less than 85; the degree of Juris Doctor "With Highest Honors" is awarded students who obtain a minimum cumulative average of 85.

RESIDENCE

Candidates for the Juris Doctor degree must complete a residence period of three academic years. Attendance in the day division for the fall and spring semesters constitutes residence for an academic year; similar attendance in the evening division constitutes residence for three-fourths of an academic year. Consequently, a day student must attend 6 semesters to meet residence requirements; an evening student must attend 8. Students authorized to take schedules

of less than 10 hours in the day division or less than 6 hours in the evening division receive residence credit on a proportional basis. Students who attend the summer sessions receive fractional residence credit.

CURRICULUM

Required and Elective Courses.—A program of required and elective courses has been developed to assure coverage of the basic courses and allow a degree of flexibility to meet the diverse interests of students. At the present time, the first-year courses and one additional course are required, leaving a total of 52 hours of electives. It is important that students plan ahead regarding their electives.

Legal Writing.—Two semester hours of credit in legal writing are required after the first year for the Juris Doctor degree. This requirement may be met by service on the *Law Review* or by the satisfactory completion of a seminar which requires a research paper. Law 344 *Legal Writing*, or Law 598 *Research in Public Law*.

Trial Practice Court.—Classroom instruction is conducted in pleading and procedure, trial and appellate practice, and evidence. This instruction includes grounding in the principles of the Federal Rules of Civil Procedure and the Federal Rules of Criminal Procedure. Students participating in the work of the Trial Practice Court serve as junior counsel and as senior counsel in the trying of cases. A special section of the court is devoted exclusively to the trial of patent cases. Experience in preparing and arguing appellate court cases is available through the Case Club Competition.



Patent Law.—The following courses are particularly suggested for students interested in patent law: Unfair Trade Practices, Patent Law, Patent Office Practice, Patent Trial and Appellate Practice, Court Review of Patent Office Decisions, and Federal Antitrust Laws. Additional courses recommended are Advanced Topics in Patent Law and Trade Regulation Seminar.

Day Division

FIRST YEAR

FALL SEMESTER		SPRING SEMESTER	
Contracts I	4	Contracts II	2
Torts	4	Property	4
Criminal Law and Procedure	4	Constitutional Law	4
Legal Research and Writing	2	Civil Procedure	4
Total semester hours	14	Total semester hours	14

SECOND YEAR

FALL SEMESTER		SPRING SEMESTER	
Elective	14	Evidence	4
		Elective	10
Total semester hours	14	Total semester hours	14

THIRD YEAR

FALL SEMESTER		SPRING SEMESTER	
Elective	12	Elective	14
Legal writing requirement (see page 11)	2		
Total semester hours	14	Total semester hours	14

Evening Division

FIRST YEAR

FALL SEMESTER		SPRING SEMESTER	
Contracts I	4	Contracts II	2
Torts	4	Criminal Law and Procedure	4
Legal Research and Writing	2	Civil Procedure	4
Total semester hours	10	Total semester hours	10

SECOND YEAR

FALL SEMESTER		SPRING SEMESTER	
Property	4	Constitutional Law	4
Elective	6	Elective	6
Total semester hours	10	Total semester hours	10

THIRD YEAR

FALL SEMESTER		SPRING SEMESTER	
Elective	8	Evidence	4
Legal writing requirement (see page 11)	2	Elective	6
Total semester hours	10	Total semester hours	10

FOURTH YEAR

FALL SEMESTER		SPRING SEMESTER	
Elective	10	Elective	10
Total semester hours	10	Total semester hours	10

SUMMER TERM OR NINTH SEMESTER

Elective 4

THE LAW REVIEW

The George Washington Law Review, edited and managed by students of the National Law Center, is devoted exclusively to state and federal public law. The location of the University in the National Capital, where the primary sources of federal public law may be observed in operation, affords an unexcelled opportunity for specialization in this field.

The staff participates in a two-year *Law Review* program. The editorial staff is selected from among those students who have successfully completed the first year of *Review* work. Students receive four hours of academic credit for the two-year program.

THE JOURNAL OF INTERNATIONAL LAW AND ECONOMICS

The Journal of International Law and Economics is a biannual publication of the Law Center, presenting articles and commentary on public and private international financial development, comparative law, and international law. In conjunction with a faculty adviser, it is managed and edited by a student

board of editors. Third-year students serving on the board of editors may earn one or two semester hours of credit by registering for Law 346 *Credit Activities.*

THE STUDENT BAR ASSOCIATION

Every student in the Juris Doctor program is a member of the Student Bar Association, which is organized to enable students to become better acquainted with problems of the profession, to foster professional ideals, and to bring about closer contact with members of the profession engaged in active practice of the law. The work of the Student Bar Association is carried on by various committees and by group and general meetings of a professional and social nature. From time to time lectures are given by outstanding authorities on legal and professional problems.

An important activity is the Van Vleck Case Club Competition, which provides an opportunity for training in appellate advocacy. First- and second-year students participate as contestants before courts composed of members of the Faculty and the local bar. Senior law students of the Case Club also sit as judges. The final argument is held before a court composed of distinguished federal judges.

The Legal Aid Program is under the joint sponsorship of the George Washington University Student Bar Association and the Junior Bar Section of the District of Columbia Bar Association. Participating students assist court-appointed attorneys in the preparation of cases for trial or appeal. Qualified second- and third-year students are eligible for participation in the program.

The International Law Society is another activity supported by the Student Bar Association. The Society offers a forum for speakers in this field and provides a way in which its members can participate in international legal activities in Washington.

In the ranking of member associations by the American Law Student Association, the George Washington University Student Bar Association has received first place twice and second place twice in past years.

ORDER OF THE COIF

The Order of the Coif, a national honor society with chapters in over forty law schools, aims "to foster a spirit of careful study and to mark in a fitting manner those who have attained a high grade of scholarship." The George Washington University Chapter was established in 1926. Members are elected each year from the highest-ranking 10 per cent of the graduating Juris Doctor candidates.

Master's and Doctoral Programs

THE ADMINISTRATION OF JUSTICE under law is a matter so vast and complex that some who hold the Bachelor of Laws or Juris Doctor degree feel the need for further study. The Master's and doctoral programs give students the opportunity to broaden and deepen their understanding of the law.

The Master of Laws candidate may follow a program of general study or concentrate in one of the specialized areas listed below. Courses in each of these areas are included in the 401–600 series. Graduates who complete their work in one of these areas may have the field of specialization noted on their diplomas.

Administrative Law: Economic Regulation
Comparative Law
Corporation Law
Environmental Law
Government Procurement Law
International Law
Labor Law
Law and Poverty
Law, Psychiatry, and Criminology
Law, Science, and Technology
Natural Resources Law
Patent and Trade Regulation Law
Taxation
Urban Legal Studies

Programs leading to the degree of Doctor of Juridical Science offer the advanced student the opportunity to concentrate on research and writing in a specific area of interest to the legal profession.



MASTER OF LAWS

ENTRANCE REQUIREMENTS

A Bachelor's degree from an accredited college or university* and a Bachelor of Laws, Juris Doctor, or equivalent degree from a law school which is a member of the Association of American Law Schools or is approved by the American Bar Association are required. The applicant must demonstrate (by a *B* average or equivalent performance measure, high class standing, *Law Review* experience, positions held, or professional achievements) that he is capable of Master's level work. Advanced standing is not granted for credits earned while a candidate for the first degree in law.

DEGREE REQUIREMENTS

The student must complete a residence period of not less than two semesters, which should be continuous. All requirements for the degree must be completed in this Law Center and in a period not exceeding three years from the time of registration for the degree. The student must complete 24 semester hours of courses as approved by his adviser and the Dean, including Law 599–600, *Thesis*. A minimum average of 75 is required.

Candidates for the degree in a selected field of specialization must complete a minimum of 12 of the required 24 semester hours in courses of the selected field. Each Master of Laws program of study should include a substantial number of 401–600 series courses.

MASTER'S THESIS

Each candidate for the degree of Master of Laws is expected to write a Master's thesis (Law 599–600) under the supervision of a member of the faculty of the National Law Center. Four hours of credit will be granted for successful completion of the thesis. The purpose of this requirement is to demonstrate the ability of the student to perform research in a special area of the law and to produce a scholarly paper containing the results of this research. The thesis is expected to be of substantially the same quality as a *Law Review* article. The requirement for a Master's thesis may be waived in appropriate circumstances.

The thesis in its final form must be presented to the Dean no later than the date specified in the Calendar. Two complete copies are required. It is the responsibility of the candidate to obtain from the Office of the Dean a printed copy of the regulations governing the styling and reproduction of theses. The mandatory thesis binding fee of $10 must be paid at the time of registration for the last semester's work.

Accepted theses become the property of the University and are deposited in the Law Library, where the duplicate copies are bound and made available for circulation. Permission to publish or adapt material must be secured from the Dean.

HONORS

The degree of Master of Laws "With Highest Honors" is awarded students who obtain a minimum cumulative average of 85.

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* The Dean is authorized to make exceptions in appropriate cases.

GRADUATE COURSES IN OTHER DEPARTMENTS

The Master of Laws candidate is encouraged to take graduate courses related to his field of interest in other departments of this University. A maximum of 6 semester hours will be credited toward the degree for such courses; however, credit will be granted only if the courses are given on campus. Courses numbered 101–200 may be taken for graduate credit only if the student receives the approval of the instructor at the time of registration and does additional work, as prescribed by the department offering the course.

CONSORTIUM OF UNIVERSITIES OF THE WASHINGTON METROPOLITAN AREA, INC.

A candidate for the Master of Laws degree may take graduate courses at Georgetown University Law Center through the Consortium of Universities of the Washington Metropolitan Area, Inc. A maximum of 6 semester hours of such courses will be credited toward the degree. Permission to take Consortium courses must be granted by the Dean and the Registrar.

DOCTOR OF JURIDICAL SCIENCE

ENTRANCE REQUIREMENTS

Admission to candidacy for the degree of Doctor of Juridical Science requires a Bachelor of Arts or equivalent degree from an approved college or university*; a Bachelor of Laws, Juris Doctor, or equivalent degree, earned with high rank, from a law school which is a member of the Association of American Law Schools or is approved by the American Bar Association; outstanding capacity for scholarly work in the field of law; and faculty approval of the applicant's dissertation topic. The applicant must also demonstrate his writing ability by submitting a copy of one or more papers or articles which he has written. He must submit an outline of his proposed dissertation topic in some detail, indicating by chapter and division within chapter the exact scope of the project. There should be a bibliography for each chapter listing books, reports, cases, and *Law Review* articles to be considered. Although the outline cannot predict every detail of the subsequent research, it must be sufficiently definite to afford the faculty a basis for evaluation.

DEGREE REQUIREMENTS

The candidate must complete (1) a residence period of not less than one academic year; (2) a course of study and research—designated by his consultative committee and approved by the faculty—of no less than 8 semester hours including *Jurisprudence*, unless previously taken, and two seminars in which research papers are required; and (3) an acceptable dissertation. The dissertation must be submitted no later than three years from the date of approval of the dissertation subject. The applicant who proposes to write on a comparative law topic must have a reading knowledge of the language in which the relevant materials are to be found. At the conclusion of his first year of residence, or

* The Dean is authorized to make exceptions in appropriate cases.

at such other time as the faculty may set, the candidate must pass an oral examination in those fields of study selected by the consultative committee. This examination is conducted by the consultative committee and such other members of the faculty and qualified experts as are selected by the faculty.

No later than the date specified in the Calendar, the candidate must submit to the Dean two complete copies of the dissertation and two copies of an abstract (not to exceed 600 words) of his dissertation. One copy of the abstract is sent to University Microfilms, Inc., for inclusion in their monthly publication, *Dissertation Abstracts*, which is distributed nationally.

Printed copies of detailed regulations regarding the form and reproduction of the dissertation, preparation of the abstract, and services offered by University Microfilms, Inc., are available in the Office of the Dean. The successful candidate for the doctorate is required, before receiving his degree, to pay a fee for the service rendered by University Microfilms, Inc. To be acceptable the dissertation must, in the opinion of the examining committee, constitute a substantial contribution to the field of law concerned and be suitable for publication. Additional information will be supplied by the Dean. Accepted dissertations become the property of the University and are deposited in the Law Library, where the duplicate copies are bound and made available for circulation. Permission to publish or adapt material in them must be secured from the Dean

Degree Programs for Foreign Students

THE NATIONAL LAW CENTER has several programs of study available to students trained in law outside the United States. These programs fall into two general categories: (1) those directed toward preparing the student for a bar examination in an American jurisdiction and (2) those that enable the student to return to his country with a more thorough understanding of some aspect of American law.

A student with a degree from a foreign law school is normally admitted to the Center as a Provisional Student, so that the faculty can evaluate his work before admitting him to degree candidacy. Appropriate credit will be granted for work taken as a Provisional Student.

In order to qualify for admission to the bar of an American jurisdiction, the student may apply for either the Juris Doctor (J.D.) or the Master of Comparative Law (American Practice) (M.Comp.L. (Am.Prac.)) degrees. The J.D. degree requires 84 semester hours of work in law school (credit is given for work in a foreign law school only in exceptional circumstances) and will qualify the student to take most U.S. bar examinations. The M.Comp.L. (Am.Prac.) degree requires 28 semester hours of work and satisfies the requirements of the District of Columbia Bar. *The student is cautioned to ascertain the requirements of the bar for which he intends to qualify prior to selection of his law school program.*

A student planning to return to his country may undertake a program leading to the degree of Master of Comparative Law (M.Comp.L.); or, if he has outstanding qualifications, he may undertake advanced work leading to the Master of Laws (LL.M.) or Doctor of Juridical Science (S.J.D.) degree. The M.Comp.L. degree programs enable the student to gain a broader comprehen-

sion of the American legal system by taking basic courses in the Law Center. The LL.M. and S.J.D. programs allow the student to work in advanced or specialized legal fields.

ADMISSION PROCEDURE

For general Admission information concerning all National Law Center students see pages 24–26.

Application, required records, and scores on the *Test of English as a Foreign Language* (see details below) must be received from *foreign applicants* no later than June 1 for the fall semester (April 1 for candidates for the Juris Doctor degree) and November 1 for the spring semester.

REQUIRED RECORDS

Applicants must request all educational institutions attended to send directly to the Dean official credentials listing subjects studied, grades received, examinations taken, and degrees received. Certified copies of diplomas and certificates from secondary schools and all colleges and universities attended are required. Records of state examinations and certificates are also needed. All records become the property of the University and *cannot* be returned.

LANGUAGE TEST

Students whose native tongue is not English are required to take the *Test of English as a Foreign Language*. Students are responsible for making arrangements for taking the test and should address inquiries to TOEFL, Educational Testing Service, Princeton, New Jersey 08540, U.S.A. The completed application form should be returned to the Testing Service at Princeton well in advance of the beginning of the semester for which the applicant seeks admission. The test fee, which should be remitted with the application, entitles the student to have his test score sent to three different institutions. Registration for the *Test of English as a Foreign Language* does *not* constitute application for admission to George Washington University.

The Bulletin of Information, obtainable without charge, contains a description of the test as well as rules regarding application, fees, reports, and the conduct of the test; lists of examination centers; examination dates; and an application blank. On the application for the test, the student should specify that the scores be sent to the Dean's Office.

ENTRANCE REQUIREMENTS

For the Degree of Juris Doctor.—Entrance requirements for foreign students are the same as those stated on pages 9–10, except that advanced standing is rarely granted for study in foreign law schools.

For the Degrees of Master of Comparative Law and *Master of Comparative Law (American Practice).*—The entrance requirements are the successful completion of and graduation from a course in arts, philosophy, letters, or sciences, equivalent to graduation from a gymnasium, lycee, or liceo; and graduation in law from a recognized foreign university.

For the Degree of Master of Laws.—The entrance requirements are the successful completion of and graduation from a course in arts, philosophy, letters,

or sciences, equivalent to graduation from a gymnasium, lycee, or liceo; an graduation in law from a recognized foreign university. The applicant mus demonstrate (by good academic record or equivalent performance measure high class standing, positions held, or professional achievements) that he i capable of Master's level work and must demonstrate a sufficient backgroun in the Common Law to undertake the Master's program.

For the Degree of Doctor of Juridical Science.—The entrance requirement are the successful completion of and graduation from a course in arts, phi losophy, letters, or sciences, equivalent to graduation from a gymnasium, lycee or liceo; graduation in law from a recognized foreign university; outstandin capacity for scholarly work in the field of law; and faculty approval of th applicant's dissertation topic. The applicant must also demonstrate his writin ability by submitting a copy of one or more papers or articles which he has written. He must submit an outline of his proposed dissertation topic in some detail, indicating by chapter and division within chapter the exact scope of the project. There should be a bibliography for each chapter listing books, reports, cases, and articles to be considered. Although the outline cannot predict every detail of the subsequent research, it must be sufficiently definite to afford the faculty a basis for evaluation.

DEGREE REQUIREMENTS

Juris Doctor, Master of Laws, and *Doctor of Juridical Science.*—Degree requirements for foreign students are the same as those stated on pages 10–13, 16, and 17–18.

Master of Comparative Law.—The student must complete a residence period of not less than two semesters, which should be continuous. All requirements for the degree must be completed in a period not exceeding three years from the time of registration for the degree. The student must complete satisfactorily 24 semester hours of approved courses of the Center, or of such other departments of the University as the faculty of the Center shall approve.

Master of Comparative Law (American Practice).—The requirements for this degree are the same as those for the degree of Master of Comparative Law except that the degree of Master of Comparative Law (American Practice) requires 28 semester hours of course work with a cumulative average of at least 65.

Unclassified Students

TWO TYPES OF STUDENTS may be admitted to the National Law Center as Unclassified Students, in accordance with the following regulations:

1. A candidate for a Bachelor of Laws or Juris Doctor degree with an above-average record at another law school which is a member of the Association of American Law Schools or is approved by the American Bar Association, may at the discretion of the Dean, be admitted as an Unclassified Student to earn credits for transfer to the other law school.

2. Graduates of law schools which are members of the Association of American Law Schools or are approved by the American Bar Association who wish to take advanced courses without pursuing degree programs may be admitted as Unclassified Students. Applicants with inferior records will not be admitted.

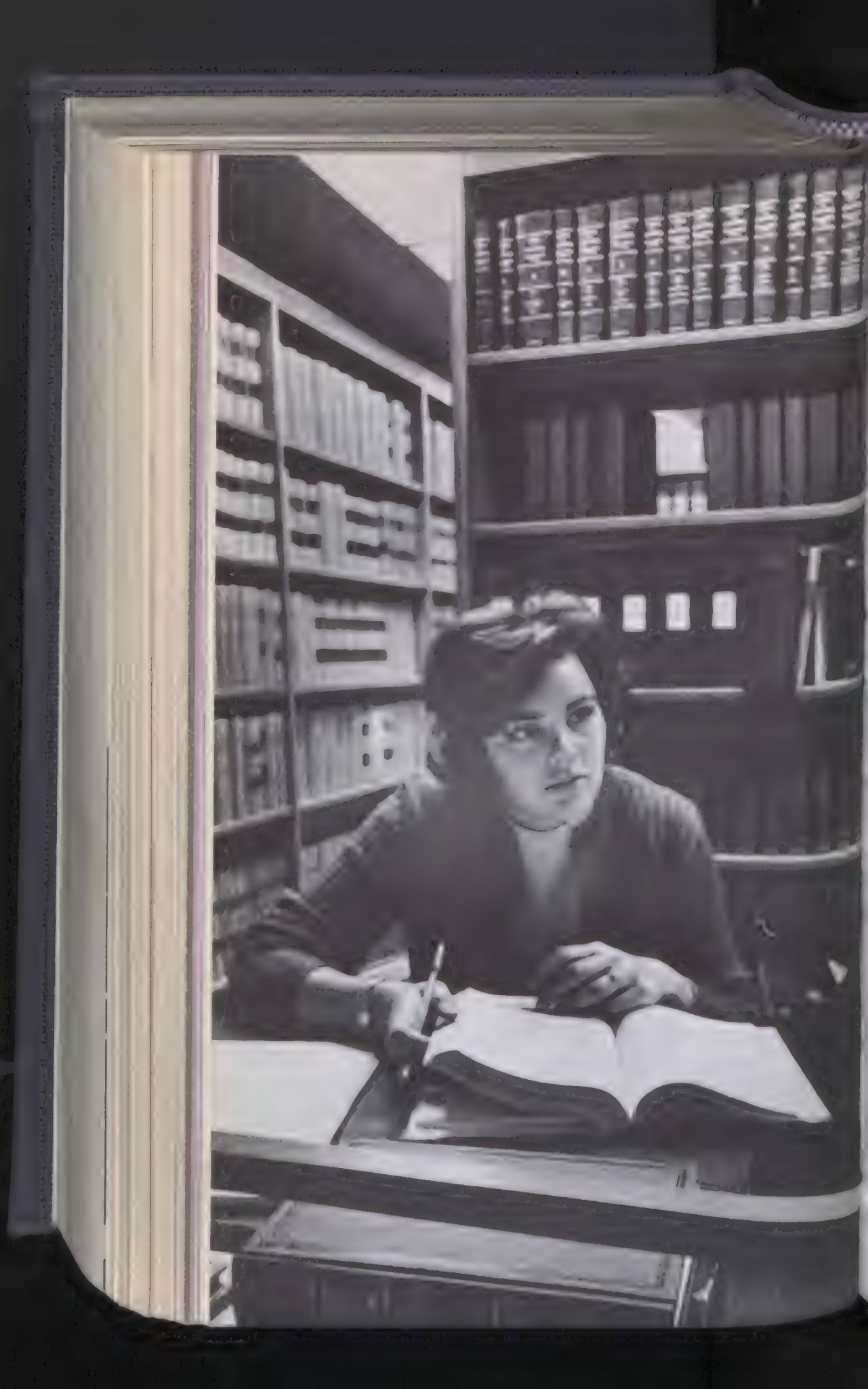
Unclassified Students participate in the work of the course, take examinations, and have their grades recorded. Credit earned as an Unclassified Student may be credited toward Master's and Doctor of Juridical Science degrees at this institution if the student transfers to degree status.

Continuing Legal Education

MEMBERS OF THE BAR wishing to keep abreast of current developments in the law may register for any of the courses in the National Law Center on a non-credit basis as Continuing Legal Education students. Such students do not take examinations in courses and no grades are recorded for their work.

A simplified admission and registration procedure is used and must be completed on or before the last day of regular registration for the appropriate semester. Continuing Legal Education students pay only the tuition fee on the semester-hour basis. They may not participate in student activities or benefit from the medical privileges of the University. (Continuing Legal Education registrations are subject to cancellation if courses are filled by regularly registered students.)





GENERAL INFORMATION

DAY AND EVENING CLASSES

DAY CLASSES meet in the mornings in fifty-minute periods and in the afternoons in fifty-minute periods and also in sessions of two fifty-minute periods, Monday through Friday. Trial Practice Court and certain other courses meet for two-hour periods on Saturday mornings.

Evening classes meet from 5:50 to 7:40 p.m., Monday through Friday. A four-credit course, e.g., Evidence, meets two evenings a week; a three-credit course, e.g., Administrative Law, meets two evenings a week for one-half the semester and one evening for the other half; a two-credit course, e.g., Contracts II, meets one evening a week. The evening division conforms to the standards of the day division, the full-time faculty participating in the instruction.

Examinations for both day and evening classes may be given in the afternoon only. Examinations for day students may be given in the evening only.

SUMMER TERM

A term of two sessions, with day and evening classes, is offered in the summer. Continuing students and transfer students may register for either or both sessions. *No beginning students are admitted to the Juris Doctor program in the summer term.*

The summer term is shorter than a semester of the academic year, and, as a consequence, a student must attend two and one-half summer terms to receive residence credit for one academic year or attend one and one-half summer terms to receive residence credit for a semester.

A maximum of 6 semester hours may be taken each session by day students. Day students receive four-tenths of a semester of residence credit for each session of the summer term in which they are registered for 3 or more semester hours. A maximum of 4 semester hours may be taken each session by evening students. Evening students receive three-tenths of a semester of residence credit for each session of the summer term in which they are registered for 2 or more semester hours.

Summer students planning to take the New York bar examination must register at the beginning of the term for both sessions and must complete both and

carry a program of at least ten classroom periods a week for day students and at least eight classroom periods a week for evening students.

THE LAW LIBRARY

The Law Library of substantially over 110,000 volumes is housed in the modern Jacob Burns Law Library Building, adjoining Stockton Hall on the south side. This facility, opened for use on October 1, 1967, comprises nine floor and deck levels with about 49,000 square feet of floor space. Its shelf capacity now in place will accommodate over 170,000 volumes; with supplementary shelving in Stockton Hall and a small branch for the *Law Review* in Bacon Hall, the library provides space for almost 200,000 volumes. Seating for more than 450 readers is provided in four reading rooms, lounge and smoking areas, carrels, enclosed study cubicles, semi-private reading alcoves, and seminar rooms. Three photocopy machines are provided for reader use.

The collections comprise a comprehensive working library of Anglo-American law, with supplementary material in disciplines peripheral to law (such as business, finance, labor relations, sociology, criminology, political science, biography, foreign affairs, and others). Special areas are maintained for collections in tax law, labor law, patent-trademark-copyright law, international law, and foreign and comparative law. Included in the collections are the appellate decisions of all state courts and decisions of the federal courts, with comprehensive collections of English and Canadian court decisions; the currently annotated statutes of the 50 states; all federal statutes; English and Canadian statutes; selected statutes of other nations; and an extensive periodical collection, kept current by more than 700 subscriptions, covering virtually all American legal periodicals and most of those published in English throughout the world. The library is strong in its treatise holdings, administrative and regulatory materials, and Congressional coverage. The growing international law holdings include virtually complete collections of United Nations printed material and that of the European Economic Community, all recent material from the International Labor Organization, and current and retrospective collections of international treaties. A large portion of the holdings of the former library of the Carnegie Endowment for International Peace, acquired by the University in 1950, are in the Law Library, as is most of the library of the former National University Law School, which merged with George Washington University in 1954.

Admission

APPLICANTS ARE URGED to submit application forms and complete credentials well in advance of the semester for which they seek admission. Two recent signed photographs and an application fee of $25 for a degree candidate, $5 for an Unclassified Student, must accompany the application.

Forms for application for admission or readmission are available at and should be returned to the Office of the Dean of the National Law Center, George Washington University, Washington, D.C. 20006.

For further details concerning students from foreign institutions, see pages 18–20.

APPLICATION FOR ADMISSION

Juris Doctor Program.—Beginning students are admitted only at the start of the fall semester.

The applicant should register with the Law School Data Assembly Service (LSDAS) by completing and mailing the registration form supplied with each application blank. A transcript from each college or university attended should then be sent directly to LSDAS, Educational Testing Service, Box 944, Princeton, New Jersey 08540. No transcript should be sent to the National Law Center. The LSDAS will analyze the transcript and send a copy to this law school and others designated on the registration form. If the transcript which has been forwarded to LSDAS does not show evidence of receipt of a Bachelor's degree, the applicant will be asked, upon acceptance, to submit a final transcript directly to the National Law Center.

To provide time for the evaluation of credentials of beginning students, all papers, including the Law School Admission Test score, should be received by the National Law Center before April 1. This means that the October or December Law School Admission Test should be taken (see "Entrance Requirements," pages 9–10).

All papers of transfer students should be received by the Office of the Dean no later than May 1 for the fall semester, December 1 for the spring semester, and one month prior to registration for the summer session for which application is made.

For additional information, see the official *Pre-Law Handbook*, 1971–72 edition, available in October, 1971, and prepared by the Law School Admission Test Council and the Association of American Law Schools. This book includes material on the law and lawyers, pre-law preparation, applying to law schools, and the study of law, together with individualized information on most American law schools. It may be obtained at college bookstores or ordered from Educational Testing Service, Princeton, New Jersey 08540.

Master's and Doctoral Programs.—Students are admitted at the beginning of the fall semester, the spring semester, or any of the summer sessions.

Application for admission, together with all required credentials, must be received by August 1 for the fall semester, December 15 for the spring semester, and one month prior to registration for the summer session for which application is made.

Unclassified Students.—Lawyers who wish to take graduate courses are admitted at the beginning of the fall semester, the spring semester, or any of the summer sessions. Students who wish to earn credits for transfer toward a Bachelor of Laws or Juris Doctor degree at another institution are admitted to the summer sessions; they are admitted to the fall or spring semester only in unusual circumstances.

1. Application for admission, with required credentials, for a student who wishes to earn credits for transfer toward a Bachelor of Laws or Juris Doctor degree at another law school (see pages 20–21), should be received at the Office of the Dean at least one month prior to the first day of registration for the semester or summer session for which application is made.

2. Application for admission, with required credentials, for lawyers who wish to take graduate courses (see pages 20–21), should be received at the Office of the Dean by August 1 for the fall semester, December 15 for the spring semester, and one month prior to registration for the summer session for which application is made.

Continuing Legal Education Students.—Students file a simplified form at any time prior to the first day of classes of the term concerned. No application fee is required, and no credentials are necessary.

READMISSION

A student who was previously registered but did not attend during the most recent semester (summer term excluded) should file an application for readmission. Closing dates for readmission are the same as those for admission (see above).

If the student has attended one or more higher institutions during his absence from the University or if he applies as a degree candidate and was previously a nondegree student, he must have complete, official transcripts sent to the Dean.

Registration

BEFORE ATTENDING CLASSES each student must present himself in person for registration. No student will be registered until proper credentials have been filed and approved (see "Admission").

No registration is accepted for less than a semester or one summer session.

A student may not register concurrently in George Washington University and another institution without the prior permission of the dean of the college, school, or division in which he is registered in this University. Registration in more than one college, school, or division of the University requires the written permission of the deans concerned, *prior to registration*. Allowance of credit for work done concurrently at another institution will be at the discretion of the Dean.

ELIGIBILITY FOR REGISTRATION

No student who is suspended or whose record is not clear for any reason is eligible to register.

New Student.—Upon receipt of a *letter* of admission a new student is eligible for registration on the stated days of registration.

Readmitted Student.—A student previously registered who was not registered for courses during the preceding semester or summer session must apply for and receive a letter of readmission (see "Readmission," above) before he is eligible for registration.

TIME AND PLACE OF REGISTRATION

Registration is held in Stockton Hall, 720 Twentieth Street, N.W., during the following periods: *fall semester*, September 7 and 8, *spring semester*, January 20–22. Hours of registration will be announced in the *Schedule of Classes*, which will be available well in advance of each semester.

A late-registration fee of $15 is charged each student who is permitted to register after the regular registration days.

Registration may be changed only with the permission of the Dean.

Fees and Financial Regulations

THE FOLLOWING FEES AND FINANCIAL REGULATIONS were adopted for the academic year 1971–72. (See page 28 for projected tuition increases for 1972–75.)

Tuition Fees

All law students except candidates for the degree of Doctor of Juridical Science:	
Full-time program (11 hours or more), each semester	$975.00
Part-time program, each semester hour	74.00
Doctor of Juridical Science,* including the final examination	2,050.00

University Center Fee (nonrefundable)

For students registered for 11 or more semester hours:	
Each semester	37.50
For students registered for less than 11 semester hours in a semester:	
For each semester hour for which the student registers	3.50
For students maintaining "continuous registration" status:	
Each semester	3.50

Graduation Fees

Juris Doctor, Master's, Doctor's degrees	25.00
Fee for binding Master's Thesis	10.00
Fee for Microfilm Service (S.J.D. candidates)	30.00

Residence Hall Fees (See page 41)

Special Fees

Application fee (degree candidate), nonrefundable	25.00
Application fee (unclassified student), nonrefundable	5.00
Application fee for room reservation, nonrefundable	100.00
Tuition deposit fee charged each student admitted to J.D. degree candidacy	100.00
Special fee (Student Bar Association activities, *Law Review*, and other services), charged each student (except students registered for "continuous registration") for each semester or any part thereof except the summer term	10.00
Fee for special examinations, for each subject	5.00
Late-registration fee, for failure to register within the designated period	15.00
Continuous Registration fee, for post-J.D. students, to maintain "continuous registration" during any semester of absence from the University or after completion of tuition requirements.† Due and payable on the official days of registration	74.00

* The tuition fee is to be paid at the rate of $512.50 a semester for four successive semesters, exclusive of the summer term or terms. No "continuous registration" fee will be charged if a third year is needed for completion of the degree requirements. If the Faculty should approve an extension of time, the student must maintain continuous registration and pay the continuous registration fee.

† The continuous registration fee applies toward neither financial nor residence requirements for the degree. This fee does not apply to students granted military leave (see page 39)

Late payment fee, charged for failure to make payments when due (see "Payment of Fees," below)	$15.00
Financial reinstatement fee, for reinstatement after financial encumbrance for nonpayment of fees (see "Payment of Fees," below)	35.00
Returned check fee, charged a student whose check is returned because of insufficient funds or improper drafting	15.00
Transcript fee, for each transcript of record	2.00

Registration on campus in the University entitles each student to the following University privileges: the services of the Student Career Services Office; the use of the University Library; gymnasium privileges; admission to all athletic contests, unless otherwise specified; subscription to the *University Hatchet*, the student newspaper; admission to University debates; medical attention as described under Student Health Service. These privileges terminate and a student is no longer in residence when he withdraws or is dismissed from the University.

PROJECTED TUITION INCREASES 1972–75

In order that students and their parents may plan more realistically, tuition increases for the academic years 1972–73, 1973–74, and 1974–75 have been estimated as follows:

*Increase by year (full-time students):

1972–73	$250.00
1973–74	150.00
1974–75	75.00

Increase by semester hour (part-time students):

1972–73	8.00
1973–74	6.00
1974–75	4.00

Every effort will be made to keep tuition increases within the above limits. However, it is not possible to project future economic data with certainty, and circumstances may require an adjustment in these estimates.

PAYMENT OF FEES

No student is permitted to complete registration or attend classes until all charges are paid. Tuition and fees for each semester are due and payable in full at the Office of the Cashier at the time of each registration. Checks and postal money orders should be made out to George Washington University.

The Student Accounts Office has responsibility for billing and maintaining student accounts for tuition, various fees, and room and board charges. A student registered for 6 semester hours or more may sign a deferred payment contract with the Student Accounts Office at the time of each registration permitting him to pay one-half of the total tuition and fees (except for fees payable in advance) at the time of registration and the remaining half on or before November 3, 1971 (for the fall semester), and March 15, 1972 (for the spring semester). Interest at the rate of 8 per cent per annum on the unpaid balance will be charged from the date of registration to the date payment is made. The

* These yearly increases are also projected for the total fee for work leading to the degree of Doctor of Juridical Science.

University will not obligate itself to notify the student, in advance, of the payment-due date for the second half of the semester charges.

Students receiving tuition assistance in the form of scholarships, government tuition contracts, or other forms of tuition awards are not permitted to sign deferred payment contracts unless the total tuition and fee charges exceed the value of the tuition awards by $465 or more. Under such circumstances the student may be permitted to pay one-half of the amount due from the student at the time of registration and to defer the balance by signing a deferred payment contract.

Students who fail to make any payment when due will be automatically charged a $15 late payment fee. Accounts which become 30 days past due will be financially encumbered and will be subject to the interest charge of 8 per cent per annum. In the event a student's account is financially encumbered, the student forfeits his rights to the use of deferred payment contracts in future semesters, and the Student Accounts Office will notify the Registrar to withhold grades, future registration privileges, transcripts, diplomas, and other academic information until the account is settled financially. Financial settlement will require payment in full of all amounts due the University in addition to a financial reinstatement fee of $35.

Students auditing courses are subject to all fees charged to students registered for credit.

In addition to the loan funds listed on page 32, there are various plans available, through the Girard Bank, Philadelphia, Pa.; Funds for Education, Inc., Manchester, N.H.; and the Riggs National Bank, Washington, D.C.; by which students may, if they meet various conditions, borrow money on a relatively short-term basis.

Full details concerning these funds are available in the Office of the Dean.

WITHDRAWALS AND REFUNDS

Applications for withdrawal from the University or for change in class schedule must be made in person or in writing to the Dean. Withdrawal from courses is permitted after the midpoint of a semester only in extraordinary circumstances. Notification to an instructor is not an acceptable notice.

Refunds are granted only during the fall and spring semesters. No refunds are granted during the summer sessions. In authorized withdrawals and changes in schedule, cancellations of semester tuition charges and fees will be made in accordance with the following schedule:

1. *Complete withdrawal* from the University:

FALL SEMESTER

Withdrawal dated on or before September 17, 1971.....90 per cent
Withdrawal dated September 20 to October 1, 1971.....75 per cent
Withdrawal dated October 4 to October 15, 1971.....50 per cent
Withdrawal dated after October 15, 1971.....none

SPRING SEMESTER

Withdrawal dated on or before January 28, 1972.....90 per cent
Withdrawal dated January 31 to February 11, 1972.....75 per cent

Withdrawal dated February 14 to February 25, 1972.....50 per cent
Withdrawal dated after February 25, 1972.....none

2. For a *change in status from full-time to part-time student* or for *partial withdrawal by a part-time student*, the above schedule applies to the difference in charges between the original program and the adjusted program continuing in effect.
3. A student enrolled in a full-time program who drops or adds a course and continues to be in a full-time program will have no financial adjustments of tuition made other than those involving course fees.
4. A student who is granted military leave before completing the semester will receive credits for current charges in accordance with the schedule for complete withdrawal from the University (see No. 1, pages 29–30). Payments made in excess of the nonrefundable balance will be refunded to the student. The nonrefundable balance will be maintained as a deferred credit for use by the student when he returns to the University (see "Military Leave," page 39).
5. Regulations governing student withdrawals as they relate to residence hall and food service charges are contained in the specific lease arrangements.

In no case will tuition be refunded or reduced because of absence from classes.

Payment applies only to the semester for which a registration charge is incurred and will not be credited to another semester (exception: students granted military leave, see page 39).

Authorization to withdraw and certification for work done will not be given a student who does not have a clear financial record.

Students are encouraged to provide their own cash funds until they can make banking arrangements in the community.



Financial Aid

THE NATIONAL LAW CENTER has been able in recent years to assist substantially all students in obtaining the financial aid they require, through full or partial scholarships, various loan programs, part-time employment, or a combination of these kinds of assistance.

LAW SCHOOL FINANCIAL AID SERVICE

An applicant for financial assistance is expected to supplement his personal application form with a Parents' Financial Information Form, processed by the Law School Financial Aid Service (LSFAS). A registration form for this service is included in the LSAT *Bulletin of Information*, or may be obtained from the National Law Center or by writing to LSFAS, Educational Testing Service, Box 944, Princeton, New Jersey 08540. The Parents' Form should be sent to the LSFAS, where it will be analyzed and duplicated and sent to each law school designated on the registration form.

JURIS DOCTOR PROGRAM

SCHOLARSHIPS AND RESEARCH ASSISTANTSHIPS

Application and correspondence concerning scholarships and research assistantships should be sent directly to the Dean. Unless otherwise specified, application and supporting credentials should be submitted no later than March 1 preceding the period for which the award is made.

Mildred Gott Bryan Scholarship Fund (1965).—Partial scholarship aid for students in the National Law Center.

Charles Worthington Dorsey Memorial Scholarship (1947).—Memorial to Charles Worthington Dorsey, LL.B. 1881, LL.M. 1882. A full-tuition scholarship for the course leading to the degree of Juris Doctor, awarded to a needy and promising graduate of this University with a Bachelor of Arts or equivalent degree. Ordinarily this scholarship is awarded once every three years.

Honor Scholarships.—Two scholarships available each year to students entering upon full-time study. Each scholarship provides a cash award for the first year, in addition to tuition aid, in an amount depending on need, for all three years. These scholarships are awarded on the basis of outstanding college records, both academic and extracurricular; Law School Admission Test scores; and need. To retain the scholarship for the second and third years, the candidates must maintain a *B* average, both for each year and cumulative.

Law Center Tuition Remission.—For students from minority groups, based on financial need.

Phi Delta Delta Scholarships (1959).—Zeta Chapter of Phi Delta Delta Legal Fraternity (International), provides tuition aid to a woman student in the second year of the Juris Doctor program who excelled in scholastic achievement and service to the Center in her first year.

Research Assistantships.—Available each year to students currently enrolled. Each assistant receives an annual stipend. Awards are made on the basis of academic standing, financial need, capacity for leadership, and research and writing potential. Applications should be submitted no later than July 1.

Research Scholarships.—Available each year to students currently enrolled preferably to applicants who are completing the second year. Scholarship awards are made on the basis of academic standing, financial need, capacity for leadership, and research and writing potential. Applications should be submitted no later than July 1.

Trustee Scholarships.—Scholarships awarded each year to entering students for tuition aid, in an amount depending on need, in the morning division. Candidates must have demonstrated qualities of leadership in addition to scholastic attainment. To retain the scholarship, the successful candidate must maintain a *B* average, both for each year and cumulative. Application must be made to the Dean before March 1.

Tuition-aid scholarships are also available to continuing second- and third-year full-time students with demonstrated scholastic ability, on the basis of financial need and capacity for leadership. Application should be made to the Dean prior to July 1. Scholarships are awarded after spring-semester grades are reported.

Frank S. Whitcomb Scholarship Fund (1971).—Bequest of Frank S. Whitcomb "for the purpose of aiding and assisting worthy young men in securing a legal education."

LOAN FUNDS

Through the generosity of friends of the University a number of loan funds are available. Among them are the Robert Ash Loan Fund; the George R. Beneman Loan Fund; the Robert M. and Mary McConnel Cooper Loan Fund; the District of Columbia Bar Association Loan Fund; the Harold L. and Violet George Foundation Loan Fund; the George Washington Law Association Loan Fund, the Jephson Educational Trust Loan Fund; the Law Association Loan Fund for the law classes of 1912, 1918, 1921, 1924, 1929, 1931, 1933, 1935, 1936, 1937, 1938, 1939, 1941, 1942, 1945, 1950, 1951, 1952, 1953, 1955, 1959, 1960, 1961, 1962, 1963, 1964, 1965; the Oscar Lawler Memorial Loan Fund; the Horace L. Lohnes Memorial Assistance Fund; the Jessie B. Martin Loan Fund; the Mike Pelekiri Loan Fund; and the Orville Hassler Walburn Memorial Loan Fund.

In addition, financial assistance is available through the Guaranteed Student Loan Program, National Defense Education Act loans, the American Bar Association Loan Program, and other sources.

Application for financial assistance should be made in the Office of the Dean.

MASTER'S AND DOCTORAL PROGRAMS

FELLOWSHIPS AND RESEARCH OPPORTUNITIES

Application should be made before March 15 preceding the period for which the award is made. The applicant should submit an application for admission as a degree candidate and a personal letter applying for a fellowship to the Dean. The letter of application should contain complete biographical data, information as to experience in practice or teaching and his draft or military status, copies of or citations to his published legal writings, and such other information as he believes will be of assistance in the consideration of his application. He should arrange for letters of recommendation to be sent from two members of his law faculty directly to the Dean. His academic rank in class

should be included either in the transcript of his law school record or in the letters of recommendation.

Computers-in-Law Fellowship.—Available each year to a post-J.D. student who has competence in some aspect of applied computer science and is conversant with at least one programming language sufficient to enable him to code his own system design. The recipient will receive a stipend of $6,000 plus tuition for the academic year for research and related study in the combined computer and law disciplines. His study is under the direction of a faculty member associated with the Computers-in-Law Institute. University courses in computer software or hardware will be available, if needed, as part of his degree program.

Environmental Law Fellowship.—A fellowship of $6,000 plus tuition, for a program leading to the degree of Master of Laws with specialization in Environmental Law. The recipient of this fellowship will follow an approved program of research and study under the supervision of the Director of the Environmental Law Program.

Government Procurement Law Followship.—A fellowship of $6,000 plus tuition, for a program leading to the degree of Master of Laws with specialization in Government Procurement Law. The fellow takes 12 semester hours of approved courses over two semesters. The balance of his time is spent in research, writing, and editorial work under the guidance of the staff of the University's Government Contracts Program. The candidate is chosen on the basis of ability to do superior legal work, demonstrated by law school record or work experience, and genuine interest in government procurement law.

Law Center Tuition Remission.—For students from minority groups, based on financial need.

Richard Paul Momsen Fellowship for Brazilian Graduate Law Students.—Bequest of Richard Paul Momsen, LL.B. 1912. Awarded 1970–71 and alternate years, for the study of U.S. constitutional law.

Teaching Fellowships.—Two fellowships available each year with a stipend of $6,000 plus tuition for an approved course of study leading to an advanced degree. Teaching fellowships are awarded for a term of two academic years. Fellows conduct the first-year course in Legal Research and Writing, hold regular class meetings, and work with the students to improve their legal writing ability.

Research Study Opportunities.—Research assistantships providing opportunity for graduate study with the program of Law, Science, and Technology and with the Government Contracts Program.

Prizes

Charles Glover Prize.—Established by Charles Carroll Glover, Jr., an Honorary Trustee of the University, in memory of his great-grandfather, an illustrious member of the bar of the District of Columbia. Consists of selected law books. Awarded annually to the student who has attained the highest average grade in the third-year, full-time course.

Kappa Beta Pi Prize.—A selected legal publication awarded annually by Eta Alumnae Chapter to the woman law student who attains the highest average for the first year.

John Bell Larner Prize.—By bequest, a medal awarded annually to the member of the graduating class who attains the highest average grade in the entire course for the degree of Juris Doctor.

John Ordronaux Prizes.—By bequest, $75 awarded annually to the student who has attained the highest average grade in the first-year, full-time course; and $75 to the student who has attained the highest cumulative average grade at the end of the second-year, full-time course.



Jennie Hassler Walburn Prize.—A cash award to the outstanding student in the field of civil procedure, established by the will of the late Professor Orville Hassler Walburn in memory of his mother.

Regulations

ACADEMIC WORK LOAD

Juris Doctor Candidates.—Juris Doctor candidates without substantial outside employment may take a program of studies of 14 hours a week. Such students may take courses in the evening only if they are not available in the day time and if a majority of the hours taken are in day courses. The Dean is authorized to approve 15-hour programs in exceptional cases; more than 15 hours in one semester will not be approved. Students with 20 hours or more of outside employment, whether in the day or evening division, must take a limited program of studies not exceeding 10 hours a week. Students taking a majority of their classes in the evening may not take more than 10 hours a week; the minimum load is 8 hours, except in special cases where 6 may be approved by the Dean for a limited time. A minimum schedule of 11 hours in the day division is required except in exceptional circumstances when a reduced program is authorized by the Dean.

Students taking more than 8 hours in the day division or 4 hours in the evening division must have the permission of the Dean to take a Bar Review course.

Students may transfer from the day division to the evening division only with the permission of the Dean.

With the approval of the Dean, second- and third-year students may take a maximum of 6 semester hours of appropriate courses in other departments of the University; such a student must receive a grade of at least High Pass or *B* to obtain credit for such courses, and in no event will the grade count in computing his cumulative average.

Master's Candidates.—Master's candidates without substantial outside employment may take a maximum of 12 hours a week. Students with 20 hours or more of outside employment must take a limited program of study not to exceed 8 hours a week. The minimum load is 4 hours unless approval for fewer hours is given by the Dean for a limited time.

ATTENDANCE

Regular attendance at classes is required and is necessary for successful work. A student who is deficient in class attendance in any course may be barred from taking the examination.

CHANGES IN PROGRAM OF STUDIES

A student may not add courses or change from one section to another of the same course without the approval of the Dean. Students may drop courses only with the written approval of the Dean. Under no circumstances may any student drop a course after the last day of classes in any semester or summer session.

RESEARCH PAPER IN LIEU OF EXAMINATION

The preparation of a research paper is required in lieu of an examination i seminars and in other courses, as indicated in the course descriptions. Th research paper must be submitted by the last day of classes of the semester: fo sufficient reason, the instructor may extend this time to the end of the exam ination period. No further extension may be granted. Students who are candi dates for the J.D. degree may register for one such course in each semeste of their third year; with the approval of the Dean such students may registe for more than one such course each semester. Approval of the Dean is re quired for second-year students to take such courses.

EXAMINATIONS

Written examinations are held at the end of most courses. Every student is required to take the regular examinations unless excused. No excuse for ab sence will be granted except by the Dean and then only for illness or other emergency. Application for excuse must be made in writing not later than one month after the date of the examination. An entry of *I*, incomplete, will be made on the record of a student thus excused. To receive credit for the course, he must take the next regularly scheduled examination. The examination may not be taken after exclusion for low scholarship.

Permission to take an examination before the regularly scheduled date will not be granted. Permission to take a postponed examination is limited to the situation provided for in the preceding paragraph.

A student who has been excused from taking a regular examination and who is a candidate for a degree to be conferred prior to the next regular examination in the subject may petition the scholarship committee, which may authorize such action as the circumstances require.

If a student fails to take an examination, a grade of 45 will be recorded unless he has been excused from the examination as provided above or has obtained the Dean's permission to drop the course.

CREDIT/NO CREDIT OPTION

Candidates for the degree of Juris Doctor may take, in addition to courses regularly given on a "credit/no credit" basis, 3 semester hours of elective course work on a "credit/no credit" basis, and will receive a grade of "credit" if the course is satisfactorily completed with a grade of 65 or better.

GRADES

Grades are given in numerical terms equivalent to letter grades as follows: 85–100, *A*, excellent; 75–84, *B*, good; 65–74, *C*, satisfactory; 55–64, *D*, poor—below standard for graduation; 45–54, *F*, failure. In courses 220, 321–22, 346, 365, 385, 399, 459, 509, and 593 grades are *CR*, credit; *NC*, no credit. A student who has been excused from failure to take a regularly scheduled examination is given the grade of *I*, incomplete, and a student who has been barred from taking an examination because of excessive absences is given the grade of *EA*. See "Examinations" (above) for grade upon failure to take an examination. Grades between 55 and 100 indicate that the work has been completed and credit given. Grades between 55 and 64, however, do not rep-

resent satisfactory work and adversely affect a student's cumulative average. No credit is given for grades below 55. A student may not repeat a course he has failed.

The cumulative average of a student includes all grades in all courses taken while he is a candidate for a particular degree. When a course is repeated (see "Academic Dishonesty," page 38), both the first grade and the subsequent grade or grades are counted in the cumulative average.

EXCLUSION AND PROBATION FOR POOR SCHOLARSHIP

Candidates for the Degree of Juris Doctor.—A student whose cumulative average at the end of any semester falls below 65.0 but is above 64.0 will be notified that he is on probation. If such a student fails to raise his cumulative average to 65.0 at the end of the next semester, he will not be permitted to register for any succeeding semester unless he petitions for and receives the permission of the Scholarship Committee.

A student whose cumulative average at the end of any semester falls below 64.0 will not be permitted to register for any succeeding semester unless he petitions for and receives the permission of the Scholarship Committee so to register.

A student who fails more than one course over his entire period of law study will not be permitted to register for any succeeding semester unless he petitions for and receives the permission of the Scholarship Committee.

A student who is not permitted to register under the foregoing provisions will be excluded as of the beginning of the semester for which he was ineligible to register.

Students who are registered at the time they receive notice that they will not be permitted to register for the next semester are entitled to withdraw from school and to receive a full refund of the tuition for the semester, or to complete the work for which they are registered.

Any student excluded may petition for reinstatement; if he can demonstrate that his low grades were due to circumstances beyond his control and that he has the capacity to pursue the study of law with a definite likelihood of success, he may be readmitted subject to such conditions as may be imposed by the Scholarship Committee.

Despite the above provisions, a student will be allowed to complete his first two semesters of law study before he is denied permission to register for a succeeding semester.

The term "semester" includes a session of the summer term.

Candidates for Masters' and Doctoral Degrees.—A candidate for a Master's or doctoral degree whose work is not satisfactory in the opinion of the faculty, taking into consideration the requirements and standards for the degree, may, by action of the faculty, be excluded at the end of the semester for which he is currently registered.

Unclassified Students.—An unclassified student whose work is not satisfactory may be excluded at the end of the semester for which he is currently registered.

SUMMER SCHOOL CREDIT

Students planning to attend summer school sessions at other law schools and desiring to use credits obtained at such schools in their Juris Doctor program

at this Center must first have the courses they wish to take approved by t Dean. In no event will credits be recognized in excess of those which mig be obtained in a similar period in this program.

TRANSCRIPTS OF RECORD

Official transcripts of student records will be issued on request of the student o former student. A fee of two dollars is charged for each transcript. No tran script will be issued for a person who does not have a clear financial record.

CONTINUOUS REGISTRATION

Degree candidates are expected to maintain continuous registration until a degree requirements are satisfied. By failing to register for one semester o more, the student breaks his registration and must be readmitted (see "Read mission," page 26). A "Readmitted Student" is required to satisfy the curricu lum requirements existing at the time of his readmission. Post-J.D. students who have completed course registration may maintain continuous registration by paying the "continuous registration" fee (see page 27). *J.D. degree can didates may not maintain continuous registration by paying the "continuous registration" fee.*

GRADUATION REQUIREMENTS

Diplomas are awarded at a February Convocation, at a June Commencement, and in September.

To be recommended by the Faculty for graduation, a student must have met the admission requirements of the National Law Center; completed satisfactorily the scholarship, curriculum, residence, and other requirements for the degree for which he is registered; and be free from all indebtedness to the University. Registration, either for course work or on the "continuous registration" fee basis, is required for the semester or summer session immediately preceding the awarding of the degree.

Application for Graduation.—An "Application for Graduation" form must be filed and the appropriate fee paid at the time of registration for the last semester or summer session of the final year. Students completing degree requirements during the Summer Sessions will be awarded diplomas (no formal convocation) September 30, *provided* they have completed all degree requirements and have applied for graduation as a part of registration for the Summer Sessions.

ACADEMIC DISHONESTY

Academic dishonesty on the part of any student will result in a disciplinary grade of *F* for the course involved and also may, upon the recommendation of the Dean's Council, result in his suspension from the University for a stated period, at the end of which time he may petition for readmission. Upon approval of the Dean's Council, the disciplinary grade of "Failure—Academic Dishonesty" will be recorded for the course involved, and this grade will be employed in the computation of the cumulative average. A student so suspended shall be withdrawn from all other courses except those in which all work has been completed.

MILITARY LEAVE

A student called to active duty may be granted military leave for the period of active duty, upon presentation to his Dean of a copy of his orders and a petition for such leave. The maintenance of "continuous registration" is not required of the student on military leave; however, he must apply for readmission to the University well in advance of the semester in which he expects to return. Payments for tuition and fees which are not refunded to the student at the time he is granted military leave will be maintained as a deferred credit for his account and use upon return to the University.

UNIVERSITY POLICY ON THE RELEASE OF STUDENT INFORMATION

In general, the policy of the University is one of attempting to keep the student's record confidential and out of the hands of those who would use it for other than legitimate reasons. At the same time, the policy must be flexible enough not to hinder the student, the University, or the community in their legitimate endeavors.

No information concerning a student will be released except as noted below:

1. Information such as whether or not the student is currently enrolled; dates of attendance; verification of date and place of birth; degrees earned, if any, date, major field or area of concentration, and honors received; home and local addresses and telephone numbers; school, college, or division of enrollment, and class; verification of signature; name and address of parent or guardian.

2. The issuance of formal transcripts of record to recognized institutions of higher learning; the certification of academic achievement to the various recognized professional associations (law, medicine, engineering, education, etc.).

Additional information will be released only on written authorization from the student, or by court order or subpoena. If a subpoena is served, the student whose record is being subpoenaed will be notified and the subpoena will be referred to the University's legal counsel.

Government investigative agencies have no inherent right to access to student files and records. If expressly requested, properly identified representatives from federal, state, or local government agencies may be given the information listed under No. 1 above.

RIGHT TO CHANGE RULES

The University and its various colleges, schools, and divisions reserve the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

RIGHT TO DISMISS STUDENTS

If a student knowingly makes a false statement or conceals material information on an application for admission, registration card, or any other University document, his registration may be canceled and he will be ineligible (except by special action of the Faculty) for subsequent registration.

The right is reserved by the University to dismiss or exclude any student from the University or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable to do so.

RIGHT TO MAKE CHANGES IN PROGRAMS

The right is reserved by the University to make changes in programs without notice whenever circumstances warrant such changes.

PROPERTY RESPONSIBILITY

The University is not responsible for the loss of personal property in any University building. A "Lost and Found" Office is maintained in the Campus Security Office.

RECENTLY ESTABLISHED REGULATIONS

An Appendix (pages 89–90) contains regulations recently approved by the University's Board of Trustees.

University Computer Center

THE UNIVERSITY COMPUTER CENTER is located on the first floor of Stuart Hall, 2013 G Street, N.W. The facilities of the Center are available for academic purposes to all registered students and to members of the instructional staff. The Center has as its principal mission the provision of a powerful computing system which serves the University in its educational and research endeavors. The Center's programming staff concentrates its efforts in conducting faculty and staff seminars, consulting with users in the preparation of complicated programs, and carrying out computer-oriented research.

The Computer Center equipment consists of an IBM system 360 Model 50 computer with 256,000 positions of core storage, a 2314-disk storage unit providing on-line storage for more than 200 million characters, a card read/punch, a high-speed line printer, and four tape drives. The principal languages available to the user are FORTRAN IV, COBOL, Programming Language One (PL/1), Assembler Language, and ALGOL. In addition, numerous utility, statistical, data manipulation, simulation systems, and special languages are available in the library of programs. Facilities are available on a first-come, first-served basis for preparation of programs and data.

Computer programming courses are offered by the School of Government and Business Administration, the Department of Statistics, and the School of Engineering and Applied Science. In addition, many other departments offer courses that utilize the computer as a research adjunct to course work.

The Computer Center is open 24 hours a day from 8 a.m. Monday to 4 p.m. Saturday.

Student Services

RESIDENCE HALLS

COMPLETE INFORMATION concerning the University's residence halls is available from the Director of Housing, George Washington University, Washington, D.C. 20006. Information concerning off-campus housing near the University

may be obtained at this Office. The reservation of rooms in private houses must be made by students.

Admission to the University does not include a room reservation. The student will receive, with his notification of acceptance, University residence hall information, an application for residence hall space, a medical examination form, and a declaration of intent to attend the University. The medical examination form must be completed by the applicant and his physician and returned to the Student Health Service. The application for residence hall space must be accompanied by a $100 *nonrefundable deposit*, which is credited toward the semester's room charge. Rooms are leased for the academic year, and lease payment must be made by July 15 for the fall semester.

1971–72 RESIDENCE HALL RATES PER PERSON FOR TWO SEMESTERS

Madison Hall (men): room and food service, $1,375; room only, $725.
Graduate Women's Residence: room, $775. Apartments in this hall have kitchen facilities.

FOOD SERVICE

Food service is available from September 7 through December 22, 1971, and from January 17 through May 13, 1972, with vacation periods and holidays excluded. Well-balanced meals are served cafeteria-style seven days a week (20 meals).

MUNSON HALL APARTMENTS

Munson Hall is a University-owned and operated apartment house containing 15 one-bedroom and 54 efficiency apartments. Graduate and married students are given priority for residence until July 15 each year. All leases are for one 12-month year.

CLOYD HECK MARVIN CENTER

The Center encompasses a building, an organization, and a program. The building is the University's center for community life. It is the physical instrument for implementation of the programs and objectives of the organization.

The organization, composed of students, faculty, administrators, and alumni, in the form of a three-board structure, provides an informal education medium for individual and group activities adapted to the leisure-time interests and needs of the University community. It also provides training for those directly involved in management and programming for the Center.

The primary purpose of the Center is the continuing development of a broad cultural, intellectual, social, and recreational program. Its secondary purpose is the provision of its various services and facilities to the campus community for the development of community life.

The Center houses a wide range of facilities to serve the needs of the campus, including dining rooms and a rathskeller, a bookstore, lounges and study areas, a theater, bowling lanes and a billiard room, a University Club, student organization offices and workrooms, meeting and conference rooms, an information center, music listening rooms, social areas, shower and dressing rooms, lockers, and parking accommodations.

STUDENT HEALTH SERVICE

The Student Health Service is an outpatient clinic designed to assist all regis-tered students with their health needs while attending the University. The service, located at 935 22nd Street, N.W. (in the H.B. Burns Memorial Building), assists with health conditions and medical emergencies by advice and treatment, proper referral when necessary, and cooperation with other physicians and medical facilities.

During the academic year, the hours are 9 a.m. to 10 p.m., Monday through Friday, and 9 a.m. to 12 noon on Saturday. The weekday hours during the summer sessions are from 9 a.m. to 9 p.m.; Saturday hours are 9 a.m. to 12 noon. A physician is in attendance during these hours.

For serious illnesses or emergencies that occur when the Student Health Service is closed, students may call the Medical Bureau (223-2200), or go to the Emergency Room of the University Hospital for treatment. Charges for both of these services are solely the responsibility of the student.

Charges for services that are not available through the Student Health Service, such as X-ray and laboratory tests, specialty services, and consultations, etc., must be paid by the student.

The Student Health Service is available only to those students who are currently enrolled in the University. A student who is not currently enrolled, or one who has severed his connection with the University, is ineligible for the service. This service is not available between the last day of examinations for a semester or summer session and the completion of registration for the next semester or summer session.

A student intending to train for an athletic team is required to pass a medical examination. The University is not responsible for injuries received in intercollegiate or intramural games, or in any of the activities of the Department of Physical Education.

HEALTH AND ACCIDENT INSURANCE

In addition to the above services, the Student Health Service Staff has arranged for Health and Accident Insurance, on an elective basis, for full-time students. Arrangements for insurance coverage are the responsibility of the student. The University assists in the subscription process by administering application cards and collecting fees during official registration periods.

A student must subscribe and pay for the coverage at the time of official registration of his school or college. For those few students who register late, the subscription will be available during official late registration. ***Subscription during late registration will not be available for those students who previously registered and failed to subscribe at that time.*** **Students who participate in the pre-registration, conducted in the spring for the following Fall Semester, must subscribe for the coverage at the time of pre-registration. The fee will be included with the tuition bill and must be paid by August 1.**

The fee charged and the coverage provided are effective, whether at the University, at home, or elsewhere, on a 6-month basis—September through February for those subscribing for the fall, and March through August for those subscribing for the spring. The fee charged at each official registration period will be the payment required for full coverage for a 6-month period and must be paid in full at the time of subscription.

The policy contract is between the individual student and the insurance carrier and is accepted at any hospital or emergency room that accepts this type of medical coverage. Details of the policy are contained in a folder available at the Student Health Service Office.

STUDENT EMPLOYMENT

The Law Center helps in the placement of its students and maintains a placement service for that purpose. In addition, the Student and Alumni Career Services Office, Woodhull House, 2033 G Street, N.W., provides assistance to students seeking full-time, part-time, or temporary employment. This Office maintains a registry of positions available and refers qualified applicants for consideration. Information is also available on Civil Service examinations.

A student taking more than ten semester hours must limit outside employment to less than twenty hours (see "Academic Work Load," page 35). It is urged that full-time students refrain from engaging in outside employment during their first year. Although work in some special areas may contribute to the learning and experience of the student, as a general rule it will compete with time needed for adequate study and preparation, which are at the heart of a good legal education.

PLACEMENT SERVICE

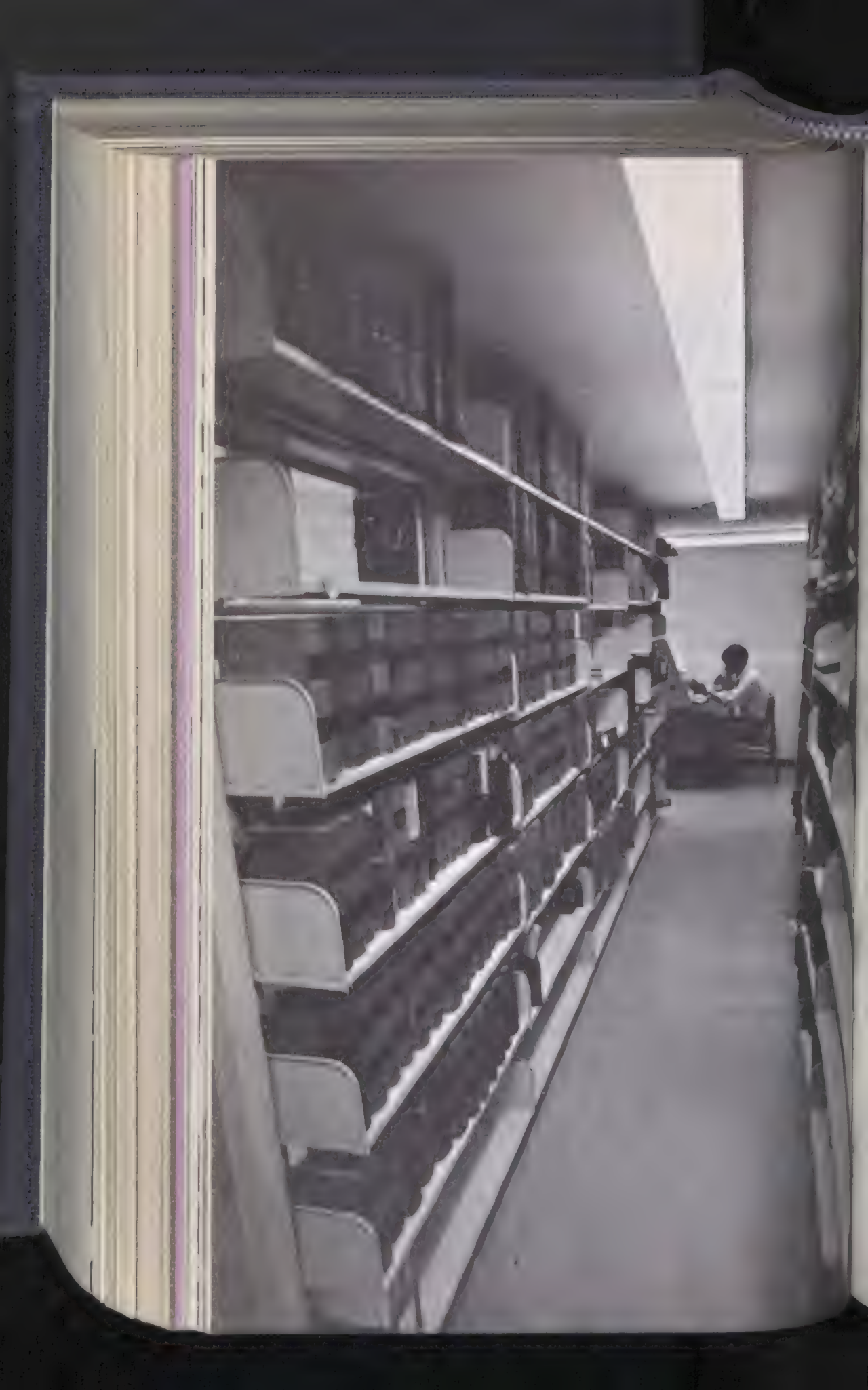
The Law Center takes a continuing interest in the placement of its graduates in private practice and governmental service as well as with industry and commerce. The Dean, the Faculty, and the Placement Office cooperate in collecting information from alumni, law firms, and government agencies concerning opportunities in legal positions throughout the country. Senior law students and recent graduates are urged to keep in touch with the Placement Office.

VETERANS EDUCATION

The Office of the Registrar, Luther Rice Hall, 2121 Eye Street, N.W., assists students entitled to educational benefits as veterans or war orphans with any problems which may arise concerning their benefits. This Office also processes certification of enrollment and attendance to the Veterans Administration so that monthly allowances will be paid.

When feasible, students entitled to benefits as veterans or war orphans should consult the Office of the Registrar prior to submitting application to the Veterans Administration. All such students should obtain the instruction sheet issued by the Office of the Registrar, which sets forth requirements to be fulfilled before certification of enrollment can be made to the Veterans Administration, and which includes other information of general interest.

The Veterans Administration is at 2033 M Street, N.W., Washington, D.C. 20421.



COURSES OF INSTRUCTION

THE COURSES OF INSTRUCTION listed below are subject to change. The University reserves the right to withdraw any course announced.

The number of hours of credit given for the satisfactory completion of a course is indicated in parentheses after the name of the course. Thus, a year course giving two hours of credit each semester is marked (2–2), and a semester course giving two hours of credit is marked (2).

In most courses, a final examination is held during the examination period, and the grade in the course is determined in large part by that examination. These courses are parenthetically marked "Examination."

Courses that require the preparation of a major research paper in lieu of an examination are parenthetically marked "Research Paper." The satisfactory completion of such a paper by a student individually will satisfy the Legal Writing curriculum requirement for the J.D. degree.

Courses parenthetically marked "Problem Assignments," "Writing Assignments," "Take-home Examination," or "Choice of Paper or Examination" indicate the nature of the method planned by the instructor for determining in major part the grade he will give for the course. A course marked with any of these designations will not satisfy the Legal Writing curriculum requirement for the J.D. degree.

Day classes begin at 9:10 a.m. and run throughout the entire morning and afternoon. Evening classes begin at 5:50 p.m. Many examinations for both day and evening classes may be given in the afternoon only. Examinations for day students may be held in the evening only.

A parenthetical designation at the end of a course description indicates whether the course is scheduled to be offered in the spring or fall semester or in the summer sessions, and also usually whether it will meet in the day or evening. When a double-numbered course is designated "Academic year," the first half of the course is scheduled to be offered in the fall, the second half in the spring. Courses with no parenthetical designation indicating time of offering are not scheduled to be given during the 1971 summer sessions or the 1971–72 academic year.

COURSES FOR JURIS DOCTOR CANDIDATES

Required courses are numbered from 201 to 300. Courses numbered from 301 to 400 are normally taken by second- and third-year students. Courses num-

bered from 401 to 600 are generally more advanced. Second-year students may take courses numbered above 400 only with the permission of the Dean. Third-year students are encouraged to take one course numbered above 400 each semester, and may take more than one such course with the permission of the Dean.

REQUIRED COURSES

203–4 **Contracts I–II** (4–2) Nash, Freedman, Cibinic, Pock, Ginsburg

Legal remedies of contracting parties, including damages in contract and quasi-contract, specific performance, reformation, rescission, remedies in tort; acts creating and terminating contractual rights, including offer and acceptance, mistake, problems of proof; function of consideration; conditions; assignments; third-party beneficiaries; effect of changed circumstances; protection of the client's interests upon breach or threat of breach by the other party. Emphasis on problems of analysis, draftsmanship, adversary method. (Examination) (Academic year—day and evening)

207 **Torts** (4) Merrifield, Seidelson, Park, Banzhaf

Liability for harm to person or property. Intentional torts, negligence, nuisance, products liability, misrepresentation, defamation, and invasion of privacy; fault and other basis for shifting losses; causation; damages; effects of liability insurance; problems under Federal Tort Claims Act. (Examination) (Fall—day and evening)

211 **Property (4)** Starrs, Schiller, J. Brown

Basic concepts of personal property. Real property: historical background of the law of estates and conveyancing, types of estates, dower and curtesy, landlord and tenant relationship, concurrent estates, future interests at common law and after the Statute of Uses; introduction to modern conveyancing—the real estate contract, the deed, the recording system, methods of title assurance. (Examination) (Fall—evening; spring—day; summer 1971)

212 **Constitutional Law** (4) Dixon, Miller, H. Green, Barron

Basic principles of American constitutionalism; judicial function in constitutional cases; implementation of doctrines of separation of powers, federalism, limited government; development and exercise of national powers; introduction to civil rights and liberties. (Examination) (Spring—day and evening)

215 **Criminal Law and Procedure** (4) Starrs, Allen, Robinson, Ferster

Origin and purposes of criminal law; elements of criminal liability; mental disorders; crimes against the person, property, and against both; statutory offenses; criminal procedure, with consideration of Federal Rules of Criminal Procedure. (Examination) (Fall—day; spring—evening)

218 **Civil Procedure** (4) Sharpe, Barron, Park, Ferster, Kayton

Mechanics of litigation—rules which govern the process by which rights and duties studied in substantive law courses are enforced; pleadings, discovery, pre- and post-trial motions, jurisdiction and venue, equity jurisdiction and trial by jury, former adjudication. Emphasis on Federal Rules of Civil Procedure, but principles and main problems indigenous to all procedural systems are developed. (Examination) (Spring—day and evening)

220 **Legal Research and Writing** (2) Seidelson and Staff

Introduction to and practical experience in the use of a law library; instruction and practice in legal writing, including a memorandum and appellate court brief; instruction and experience in the preparation and argument of an appellate court case. The grade *CR* (credit) or *NC* (no credit) is given for this course. (Fall—day and evening)

232 **Evidence** (4) Seidelson, Robinson

Preparation and presentation of evidence, including proof of writings; qualification and examination of witnesses with emphasis on impeachment; privilege; opinion testimony; determination of relevancy; demonstrative, experimental, scientific evidence; application of the hearsay rule. (Examination) (Spring—day and evening; summer 1971)

ELECTIVE COURSES

302 **Admiralty** (2) Sharpe

Doctrines originating in admiralty courts—prize, maritime liens, salvage, general average, negligence in ship collisions and otherwise, maintenance and care, unseaworthiness; maritime law from legislative origins—personal injury and death remedies, limits on shipowners' liability, regulation of carriage of goods and persons; admiralty jurisdiction and maritime law in the federal system. (Examination) (Fall—day)

303 **International Law and World Order** (3) Mallison

Traditional content of introductory course in international law presented in context of values and institutions of world community; emphasis upon national states as participants in decision-making processes with consideration also of individuals, international public organizations, political parties, pressure groups, private associations; analysis of range of available sanctions; roles and effects of international agreements under United States Constitution; introduction to the law of war. Complements but does not repeat material in Law 391. (Examination) (Fall—day and evening; summer 1971)

307 **Comparative Law** (3) Albert

Civil Law System, general introduction to foreign law as exemplified by Roman Law and French and German Civil Codes, comparative study of administration of justice and legal institutions. Delictual and contractual obligations. (Writing Assignments) (Spring—day)

309 **Conflict of Laws** (3) Dixon, Seidelson, Pock, Ferrara

Legal problems arising from occurrences transcending state or national boundaries; jurisdiction; foreign judgments; constitutional influences; theoretical bases of choice of law principles and their application to specific fields, including torts, contracts, property, family law, administration of estates, business associations. (Examination) (Fall—evening; spring—day; summer 1971)

311 **Agency and Partnerships** (2) Sharpe, Schiller

(Formerly Business Associations I)

Legal principles concerning association in business by agency, partnership, other unincorporated forms, and corporations; creation, form and nature of agency, partnership and corporation; basic principles of agency and partnership and introductory related principles of corporation law. (Examination) (Fall—day and evening; summer 1971)

312 **Corporations** (4) Kirkpatrick, H. Green, Stevenson
(Formerly Business Associations II)

Corporate law, with emphasis on operations and financing of corporations. Control of corporations, action by corporate directors, officers, shareholders. Control devices. Directors' and shareholders' duties of care and loyalty, insiders' transactions in shares of the corporation. Derivative suits, kinds of shares, dividends, corporate distributions. (Examination) (Fall—day; spring—day and evening)

313 **Sales and Sales Financing** (2) Albert, Rothschild, Ginsburg

Provisions of the Uniform Commercial Code relating to sale and distribution of goods, including bulk transfers, warehouse receipts, bills of lading, and other documents of title; particular attention to secured transactions and financing devices utilized in this connection. (Examination) (Fall—day and evening)

314 **Commercial Paper, Check Collection, and Banking** (2) Albert, Rothschild

Classic view of negotiable instruments as codified by Article III of the Uniform Commercial Code. Check collection: the system in theory as expressed in Article IV of the Uniform Commercial Code and the system in practice; Federal Reserve regulations, Clearing House agreements, and automation systems. The dual banking system, work of the Comptroller General and the Federal Reserve Board. Legal problems concerning interest and the checkless society. (Examination) (Spring—day and evening)

318 **Creditors' Rights** (3) Kirkpatrick

Creditors' remedies outside bankruptcy—compositions, agreements, general assignments; bankruptcy proceedings under the federal statute, administration, discharge, the position and powers of the trustee, preferences; corporate reorganization under Chapter X of the Bankruptcy Act. (Examination) (Fall—day and evening)

321–22 **Current Decisions** (2–2)

Limited to members of the student staff of the *Law Review*. A maximum of 4 semester hours of credit may be earned in these courses: Law 321–22 and Law 346. The grade *CR* (credit) or *NC* (no credit) is given for this course. (Academic year—day and evening)

325–26 **Trusts and Estates I–II** (3–3) Weaver, Kuhn

Noncommercial transfers of wealth at death or during life. Law 325: essential elements and formalities for creation of trusts and execution of wills, revocation and alteration, grounds for contest, limits on property owner's power to control, intestate succession. Law 326: dispositive provisions, common questions of construction, future interests problems, administration of estates and trusts, charitable trusts. Prerequisite to Law 325: Law 211; to Law 326: Law 325. (Examination and Problem Assignments) (Academic year—day and evening; summer 1971—Law 325)

327 **Modern Real Estate Transactions** (2) Schiller, J. Brown

Advanced problems in conveyancing; private control of land use—easements, covenants, equitable servitudes; planning and zoning—the forms of zoning, appraising the purposes of zoning ordinances, municipal authority to zone against the will of other governments, due process in zo-

ing matters, nonconforming uses. Brown—(Problem Assignments or Take-home Examination) (Spring—day)

329 **Unfair Trade Practices** (3) Weston, Banzhaf

Unfair trade practices at common law and under statutes; trademarks, trade names; copyright law; misappropriation of ideas; protection of competitors and consumers against false advertising under Federal Trade Commission Act; resale price maintenance under state Fair Trade Acts; state sales-below-cost statutes; Robinson-Patman Price Discrimination Act; miscellaneous business practices. Weston—(Examination) (Fall—day and evening)

330 **Federal Antitrust Laws** (3) Weston, Kirkpatrick

Sherman and Clayton Acts, related statutes. Price fixing agreements and other types of trade restraints considered under Section 1; monopolizing considered under Section 2 of the Sherman Act. Mergers and tie-in sales; other activities under the Clayton Act. All types of business conduct raising questions under the antitrust laws, including trade association activities, exclusive-dealing arrangements, boycotts, patents and copyrights. (Examination) (Spring—day and evening)

332 **Federal Jurisdiction** (2) Sharpe, Barron, Albert, D. Green

Relationship of federal courts to Congress and to the states, through analysis of cases dealing with federal judicial functions (including problems of advisory opinions, standing to litigate, justiciability), federal questions in federal courts, federal review of state court decisions (including relation between state and federal substantive law, procedural problems in exercising review, application of law to fact). Sharpe, Barron, Albert—(Examination); Green—(Problem Assignments) (Fall—day and evening; summer 1971)

334 **Advanced Criminal Procedure** (2) Starrs, Robinson, Ferster

Decision to arrest, prosecutive discretion, bail, the preliminary hearing, right to a speedy trial, discovery, plea bargaining, publicity, post-conviction procedures. Starrs—(Examination and Problem Assignments); Robinson, Ferster—(Examination) (Fall—day and evening)

335 **Jurisprudence** (2) Mayo, Kramer

Basic jurisprudential concepts; nature of law; development of legal institutions; jurisprudential schools—natural law, analytical, historical, sociological, functional; law and logic; law and justice; the judicial process; legislative, executive, administrative decision making; impact of politics, economics, and scientific advance on legal systems; contemporary trends in jurisprudential thought, Mayo—(Examination); Kramer—(Writing Assignments) **(Fall—evening; spring—day)**

336 **Taxation—Federal Income** (3) Weaver, Hambrick

Survey of substantive provisions of federal income tax law, including concept of gross income, provisions affecting taxation of family and individual transactions, limitations on allowable deductions, sales and dispositions of property, problems of capital gains taxation, nontaxable exchanges. Weaver—(Examination and Problem Assignments); Hambrick—(Examination) (Fall—day and evening; spring—day; summer 1971)

338 **Taxation—Federal Estate and Gift** (2) Kramer, Hambrick

Survey of substantive provisions of federal estate and gift tax laws, including inter vivos transfers, transfers in contemplation of death, joint interests, life insurance proceeds, property subject to powers of appointment, marital deduction and split gifts; tax procedure. (Examination) (Fall—day and evening)

339 **Collective Bargaining and Labor Arbitration** (3) Merrifield, Rothschild

Collective labor agreement: content, negotiation, administration through grievance procedure and arbitration; problems in settlement of labor disputes. Merrifield—(Examination and Problem Assignments); Rothschild—(Problem Assignments) (Spring—day and evening; summer 1971)

340 **Taxation—Federal Income, Corporations and Shareholders** (3) Hambrick, Tannenwald, Tucker

Continuation of Law 336. Primary emphasis on corporate-shareholder relationships. Problems of corporate dividends, redemptions of stock, distributions in partial and complete liquidation, stock dividends, bail-outs, and dividends in kind closely analyzed. Federal income tax problems involved in the formation of corporations, the sale of corporate businesses (including collapsible corporations), mergers and acquisitions, and corporate divisions. Students who have received credit for former Law 337 cannot receive credit for Law 340. Prerequisite: Law 336. (Examination) (Spring—day and evening)

341 **Labor Law** (3) Merrifield, Albert, Rothschild

Law governing labor-management relations, organizations and representation of employees, regulation of economic weapons, enforcement of collective bargaining agreements, interunion and intra-union relations. (Examination) (Fall—day and evening; summer 1971)

344 **Legal Writing** (1 or 2) Staff

Preparation of a research paper under the supervision of a full-time member of the Faculty who will determine, prior to registration, whether the work required for the topic selected justifies one or two semester hours of credit. If elected for one hour of credit, this course may be repeated to meet the legal writing requirement for the degree. Approval of the Dean is required prior to registration. (Research Paper) (Fall and spring—as arranged)

346 **Credit Activities** (1 or 2) Staff

Work done in connection with the Legal Aid Bureau, the Law Students Civil Rights Research Council, the *Journal of International Law and Economics*, or the Moot Court Competition; under the supervision of the faculty adviser, who will determine, prior to registration, whether the work required justifies one or two semester hours of credit and whether the student has complied with all prerequisites. May be repeated for credit not to exceed 4 semester hours. No more than 2 semester hours may be taken in any one activity. Students registering for Law 346 who have taken or plan to take Law 399 are reminded that a maximum of 10 semester hours of credit may be earned in these courses—Law 346, 399, 459, and 509. A maximum of 4 semester hours of credit may be earned in these courses—Law 321–22 and 346. The grade *CR* (credit) or *NC* (no credit) is given for this course. (Fall and spring)

347 **Insurance** (2) Schiller, Pock

A primary risk distributing medium and the rules by which legislative, administrative, judicial bodies seek to promote its benefits and avert its dangers. Includes insurance marketing, insurable interest, subrogation, transfer of insurance benefits to nonpolicyholders, coverage and other insurance policy provisions, disposition of claims. (Examination) (Spring—day and evening; summer 1971)

348 **Domestic Relations** (2) Seidelson, Potts, Ferster

Marriage, annulment, and divorce; adoption and custody of children; economic relations. Seidelson, Potts—(Examination); Ferster—(Problem Assignments) (Fall—evening; spring—day; summer 1971)

349 **Local Government Law** (2) Nutting, Pock

Decision-making processes in metropolitan and local communities; types and objectives of city, county, special-function local government units; intergovernmental relations; original organization and changes; personnel; local lawmaking; responsibility in tort; introduction to community planning. (Examination) (Fall—evening; spring—day)

351 **Law and Accounting** (2) Cibinic, Ginsberg

Study of fundamental accounting principles with emphasis on corporation accounting; legal and accounting implications of specific items in financial statements of corporations; inventory adjustments; corporate transactions, distributions, capital adjustments. Strongly recommended for students who have had no accounting. (Examination and Problem Assignments) (Fall—evening; spring—day)

355 **Government Contracts** (2) Cibinic

Survey of basic law underlying government procurement, basic power and limitations on federal government in entering into contracts, administrative and legislative policies governing these contracts, advertised and negotiated procurement procedures, forms of contracts and clauses used. Law 431 *Government Procurement Law* is the substantial equivalent of this course. (Examination and Problem Assignments) (Fall—day)

359 **Patent Law** (3) Kayton

(Law 359 and Law 362 replace former Law 360 Patent Property (4))

Law of patents subsequent to issuance of patent; nature of patent as property and as a legal instrument; validity—novelty, nonobviousness, commercial success; infringement—direct and contributory, doctrine of equivalents and file-wrapper estoppel. Substantive concepts introduced in an order approximating patentee's and infringer's cases in litigation. Designed for students intending to specialize in patent law; knowledge or experience in patent law helpful but not prerequisite. (Examination) (Fall—evening)

362 **Patent Office Practice** (2) Kayton

(Law 359 and Law 362 replace former Law 360 Patent Property (4))

Substantive and procedural law of patents leading to issuance of patent, mainly related to proceedings before U.S. Patent Office. Obtaining and preserving earliest possible patent filing date; continuing applications, res judicata, novelty and nonobviousness requirements; substantive rules of priority of invention and related affidavit practice; nature of claims and formal defects; restriction and double patenting. Designed for students intending to specialize in patent law. Prerequisite: Law 359 or the equivalent in experience. (Examination) (Spring—evening)

365 **Patent Trial and Appellate Practice** (2) T. Brown

Practice before U.S. Court of Customs and Patent Appeals and federa courts. Students may repeat this course once for credit. A maximum of 4 semester hours of credit may be earned for both Law 365 and 385. Pre requisite: Law 359 and 362, or former Law 360, and forty-two additional hours of Law. Prerequisite or concurrent registration: Law 218 and 232 The grade *CR* (credit) or *NC* (no credit) is given for this course. (Fall and spring—evening)

370 **Selective Service Law** (2) Ginsburg

Analysis of the Selective Service Act and implementing regulations, as interpreted by the courts. Discussion of selection (including the lottery) exemptions and deferments, special problems of conscientious objectors procedures within the Selective Service, court review, punitive reclassification, medical and psychiatric standards and procedures, legislative proposals, and problems in prosecuting and defending draft cases. (Examination and Problem Assignments) (Spring—day)

372 **Administrative Law** (3) Miller, Park, Banzhaf

Study of the administrative process in executive and independent regulatory agencies; emphasis on judicial review. Formal and informal decision-making, investigation, planning, and public administration functions of the agencies as related to their legal limits and to the roles of lawyers in government and private practice. Relationships of agencies to the executive and legislative branches, to public and private interest groups, and to the social, political, and economic aspects of various philosophies of government regulation. Miller —(Research Paper); Park —(Examination and Writing Assignments); Banzhaf—(Examination) (Fall—day; spring —evening; summer 1971)

374 **Equity** (2) Nutting, Pock, D. Green

Nature of equity jurisprudence through analysis of selected problems in equity; historical development of equity, including problems of merger of law and equity; use of equity jurisdiction offensively and defensively, including multi-party actions, injunction of executive and legal actions, equitable abstention; emphasis on fashioning of equitable remedies. Nutting, Pock—(Examination); Green—(Problem Assignments) (Spring —day and evening; summer 1971)

376 **Restitution** (2) Nash, Sharpe

Quasi-contracts, constructive trusts, rescission, and other legal and equitable remedies for restoring property and money which unjustly enrich others at the expense of volunteers, victims of misappropriation, and parties to mistaken contracts. (Examination) (Spring—day; summer 1971)

377 **Legislation** (2) Nutting

Legislative process and roles of participants in the process; operation of United States Congress and state legislatures, including fact finding, organization, procedure. Statutory interpretation emphasized to provide foundation for more advanced courses. (Examination) (Fall—day and evening)

380 **Environmental Law I** (3) Reitze

Government control of the environment, solid waste management, water and air pollution control, control of the electric power industry, common

law remedies, the urban environment, and transportation problems. (Examination) (Fall—day; spring—evening)

381 **Environmental Law II** (3) Reitze

(Formerly Air, Water, and Solid Waste Pollution Control)

Survey of private water law, river basin management soil conservation, rural development and resources protection, public land law, recreation on public lands, forestry and grazing, public mining law, ocean environmental law, public regulation of the oil and gas industry, and selected problems in international resources management. (Examination) (Spring—day)

385 **Trial Practice Court** (2) J. Jackson, T. Jackson, Herrick, Ryan, Kendrick, Skinker, Stevas, Altshuler

Trial of assigned cases, trial tactics and techniques, pre-trial and court room procedures pursuant to federal rules. Students may repeat this course once for credit. A maximum of 4 semester hours of credit may be earned for both Law 385 and 365. Prerequisite: forty-two semester hours, including Law 218. Prerequisite or concurrent registration: Law 232. The grade *CR* (credit) or *NC* (no credit) is given for this course. (Fall and spring—day and evening)

388 **Appellate Practice and Procedure** (2) Freedman

Students participate in preparing an actual criminal case on appeal, starting with review of trial transcript and culminating with preparation of brief and oral argument before U.S. Court of Appeals for the District of Columbia Circuit or the U.S. Supreme Court. Appellate practice and procedure studied through texts; consultation with appellate judges, law clerks, and attorneys with cases pending on appeal; observation of arguments in the Supreme Court and the Court of Appeals. Admission by permission of instructor. (Research Paper)

389 **Medicine for Lawyers** (2) East

Basic rudiments of medicine as encountered in a malpractice suit, divorce case, et. al., including medical terminology which will enable the lawyer to communicate more effectively with medical specialists. (Examination and Writing Assignments) (Fall—day)

390 **Forensic Medicine** (2) Sharpe, Head

A survey of interprofessional relations between physicians and lawyers in the office, the hospital, and the courtroom, with incidental attention to laboratories, legislatures, and administrative agencies. Undergraduate law students and second-year medical students study how their professions accommodate conflicts between economics and ideals, and how they exercise judgment in applying their technical skills. (Examination) (Fall—day and evening)

391 **United Nations Law and World Order** (2) Mallison

Introduction to international law through study of law and practice of United Nations Charter; structure and process of decision of United Nations; maintenance of international peace and security—peaceful settlement of disputes and national and collective self-defense; formulation and implementation of human rights. Complements but does not repeat the material in Law 303. (Examination) (Spring—day and evening)

394 **Women and the Law** (2) Kessler

An examination of the treatment of women in all areas of the law. Emphasis on education, public accommodations, employment, and health and welfare services. Students will choose clinical projects on which to focus the semester's work. Admission by permission of instructor. Enrollment limited to 15 students. (Research Paper) (Spring—evening)

395 **Public Participation Strategies: Tax Policy** (2) Nader, Stanton

(Formerly Legal Strategies and Federal Regulatory Problems)

Study of the development of legal strategies with the administrative and legislative processes; emphasis on the formulation of tax policy. Specific cases will be studied for analysis of potential alternative strategies for constructively affecting the decision process. Two-thirds of the course will be devoted to the study of past cases, the last third to the formulation of strategies to influence pending decisions. Open to a limited number of third-year students. The final grade will be based upon class participation and the quality of strategy formulated to deal with a specific problem selected by the student with the approval of the instructor. (Writing Assignments) (Fall—day)

399 **Clinical Law Work** (arr.) Staff

Projects involving litigation, research, or public interest activities of a legal nature (including aid to indigents, support of public interest nonprofit corporations, and support of governmental agencies or courts) may be initiated and will be supervised by a faculty member. Projects must be approved in advance by the Law Center Supervisory Committee (three members) both as to whether the project is appropriate and as to the number of semester hours of credit to be granted. A maximum of 10 semester hours of credit may be taken in one or two semesters. If students elect Law 346, *Credit Activities*, or Law 459, *Problems of the Consumer*, or Law 509, *Clinical Studies in Environmental Law*, the number of semester hours of credit they receive for these courses will be deducted from the maximum of 10 hours they can receive for Law 399. This course is open to a limited number of third-year law students. The grade *CR* (credit) or *NC* (no credit) is given for this course. (Fall and spring)

ADVANCED COURSES

ADMINISTRATIVE LAW: ECONOMIC REGULATION

Faculty Advisers: J.A. Barron, A.S. Miller, R.E. Park, G.E. Weston

402 **Executive Function** (2) Miller

Executive branch in constitutional theory; major trends in development of executive-administrative function; organization of executive branch; relationship of executive to Congress and judiciary; policy-making procedures within executive branch including role of Bureau of the Budget in national policy planning; case studies in exercise of executive power in such functional areas as national defense, race relations, national economy, foreign economic relations; role of law and lawyers in executive decisional and implemental process. (Research Paper)

403 **Public Economic Policy and the Law** (2) Stark

Interrelation of law and economics in such subject-matter categories and decisional contexts as economic regulation of industry, fiscal policy planning, government research and development practices, foreign trade and

investment, and public spending priorities. (Research Paper) (Fall—evening)

404 **Securities Regulation** (2) H. Green, M. Cohen, Stranahan, Mathews

State and federal laws governing offering and distribution of securities to the public by corporate issuers and others, regulation of securities markets, rights and liabilities of purchasers under such statutes. Emphasis on statutes administered by Securities and Exchange Commission. (Take-home Examination) (Fall—evening; spring—day)

405 **Regulation of Securities Markets** (2) Rotberg

Operation of over-the-counter and exchange markets, including competitive and monopolistic practices in each market; relationship of antitrust laws and securities regulations to concept of a free and open market place; role of regional exchanges and third market in providing competitive element in market; advantages and disadvantages of a fragmented market; minimum fee structure, rebates and their effect on merchandising of securities and financial soundness of industry; use and availability of economic data in evaluating performance of market place. The seminar will examine matters directly of interest to graduate law students, lawyers, economists, and political scientists. (Take-home Examination) (Spring—evening)

407 **Seminar: Regulation of Transportation I** (2) Hill

History of development of modes of transportation in the United States; economic problems and growth of regulatory legislation and philosophy; the congressional power to regulate; the scope of federal regulation; division of regulatory authority between federal and state governments; introduction to principles of certification and rate-making. (Examination) (Fall—evening)

408 **Seminar: Regulation of Transportation II** (2) Hill

Principles of certification of rail, motor, water, and air carriers; elements and principles of rate-making; comparison of problems, procedures, and regulatory philosophies of the various regulatory agencies. (Examination) (Spring—evening)

412 **Food and Drug Law** (2) Goodrich, Kaplan, Kleinfeld

The Federal Food, Drug, and Cosmetic Act, and related laws. Consumer, government, and industry viewpoints. (Choice of Paper or Examination) (Spring—evening)

413 **Public Policy and Mass Media** (2) Barron, Cohn

Institutional structure of mass media and their interrelationships; psychological aspects of mass communications; continuing adjustments among public interest goals, the economic system, and technological developments; influence of and controls exercised by government, other institutions, and private groups; conflict between freedom of speech of the media and other major community interests; the media's relationships to the interests of dissident and minority groups and the access of these groups to the media. Barron—(Choice of Paper or Examination); Cohn—(Research Paper) (Fall—day; spring—evening)

414 **Regulated Industries** (2) Park

Substantive problems of business regulation in terms of natural monopolies, licensed industries, subsidized industries, and safety regulation. Typi-

cal problems raised include the role of intervenors, the impact of regulation upon management and market behavior, the uses and abuses of economic evidence, the role of agencies' staffs, interagency planning and regulation, and the effects of judicial and legislative review. Each student selects one industry and develops his insight into economic regulation in terms of that industry's firms, market structure, growth and development, trade associations, and regulatory agencies. (Research Paper) (Spring—evening)

417 Seminar: Trade Regulation (2) **Weston**

Group study of current problems relating to unfair trade practices and federal antitrust laws. (Research Paper) (Spring—evening)

Master of Laws candidates in the area of Administrative Law: Economic Regulation who have not taken the following courses or their equivalent as part of a Juris Doctor or Bachelor of Laws program should include them in their Master's program.

329 ***Unfair Trade Practices***
330 ***Federal Antitrust Laws***
372 *Administrative Law*

OTHER RELATED COURSES

451 ***Federal Programs for Urban Poverty***
493 *Intergovernmental Aspects of Technological Change*
494 *Use and Control of Atomic Energy and Space Technology*
505 *Intergovernmental Relations I*
506 *Intergovernmental Relations II*
571 *Land Use Planning*

CORPORATION LAW

Faculty Advisers: H.P. Green, R.B. Stevenson

422 **The Modern Corporation** (2) Miller

Analysis of the nature and role of the large business corporation in the American political economy; models of the corporation; the transnational or multinational enterprise; the concept of accountability as applied to corporate activities; reasons for the growth of large corporate enterprise; relationships of the "supercorporations" to other centers of decentralized power and to the government; the corporation as the basic planning unit of the American economy; application of the Constitution to the corporation. (Research Paper) (Fall—day)

424 **Business Planning** (2) H. Green, Stevenson, S. Cohen, Seigel, Uretz

Integrated study of corporate, financial, tax, accounting, and SEC aspects of the following: organization of a small corporation; organization of a public corporation; stock dividends, recapitalization, and stock repurchases in the context of conflict between active stockholders of a close corporation and the family of a deceased active stockholder; corporate liquidations; corporate mergers and acquisitions; and divisions of corporations. Prerequisite: Law 312 and 336. Green, Stevenson—(Problem Assignments); Cohen, Seigel, Uretz—(Writing Assignments) (Fall—day; spring—day and evening; summer 1971)

427 **Legal Aspects of International Business Transactions** (2) Nurick, Guttentag

U.S. law and practice, including current tax problems and U.S. restrictions on investment; brief comparison with British and Civil Law systems; international law, international contracts, choice of law; currency considerations; effect of SEC laws and regulations; international trade, including GATT and reciprocal trade arrangements; sources of finance, both United States and foreign, private and public, including international organizations; protection of property, settlement of disputes, and selected case studies. In addition to the regular lecturers, there will be guest lecturers in various specialties. Emphasis on current problems in international trade and investment. Prerequisite: Law 303. (Choice of Paper or Examination) (Spring—evening)

Master of Laws candidates in the area of Corporation Law who have not taken the following courses or their equivalent as part of a Juris Doctor or Bachelor of Laws program should include them in their Master's program.

312 *Corporation*
313 *Sales and Sales Financing*
329 *Unfair Trade Practices*
330 *Federal Antitrust Laws*
340 *Taxation—Federal Income, Corporations and Shareholders*

OTHER RELATED COURSES

417 *Seminar: Trade Regulation*
431 *Government Procurement Law*
525 *Copyright Law*
526 *U.S. and International Trademark Practice*
540 *Comparative Conflict of Laws and Transnational Legal Problems*
541 *Seminar: European Common Market*
555 *Taxation—Special Corporation Problems*
562 *Income Taxation of Foreign Business and Investment*

GOVERNMENT PROCUREMENT LAW

Faculty Advisers: J. Cibinic, Jr., G.J. Ginsburg, R.C. Nash, Jr.

431 **Government Procurement Law** (2) McIntire

Survey of the law pertaining to government procurement, including an analysis of the unique features of government contracting and a discussion of the functions of Congress, the executive branch, and the courts in the procurement process. Law 355 *Government Contracts* is the substantial equivalent of this course. (Examination) (Fall—evening)

432 **Formation of Government Contracts** (2) McIntire

Detailed coverage of the rules and practices followed in arriving at contracts between the government and private parties. Comparison in depth of advertised and negotiated procurement and analysis of the techniques used in pricing and arriving at the terms of such contracts. (Examination) (Spring—evening)

433 **Performance of Government Contracts** (2) Nash, Cibinic

Discussion of the substantive legal problems that most frequently arise during the performance of government contracts. Interpretation of specifications and the most generally used contract clauses, and analysis of the rights of the parties when performance in accordance with the terms of the contract is not obtained. (Examination and Problem Assignments) (Spring—evening)

434 **Government Contract Claims and Litigation** (2) Nash, Ginsburg

Analysis of the methods which can be used by the parties to a government contract to obtain legal relief, including detailed coverage of the disputes procedure, actions for breach of contract, and forms of equitable and extraordinary relief (Examination and Problem Assignments) (Fall—evening)

435 **Seminar: Government Contracts** (2) Nash, Cibinic, Ginsburg

Research and discussion of selected problem areas. (Research Paper) (Summer 1971)

OTHER RELATED COURSES

402 *Executive Function*
424 *Business Planning*
427 *Legal Aspects of International Business Transactions*
442 *Labor Standards and Equal Employment*
494 *Use and Control of Atomic Energy and Space Technology*
495 *Legal Protection against Technological Hazards*
505 *Intergovernmental Relations I*
506 *Intergovernmental Relations II*
535 *Negotiation: Concepts and Techniques*

LABOR LAW

Faculty Advisers: J.M. Albert, L.S. Merrifield, D.P. Rothschild

441 **Seminar: Disability and Retirement Problems** (2) Doherty

Study of selected problems under workmen's compensation; old age, survivors, and disability insurance; medicare; and private welfare and pension plans. (Examination) (Fall—evening)

442 **Labor Standards and Equal Employment** (2) Ginsburg

Analysis of the Fair Labor Standards Act, its scope and exemptions, the Civil Rights Act and other labor statutes; the laws establishing labor standards for government contracts, including the Davis-Bacon Act, Walsh-Healey Act, Service Contract Act, and Work Hours Act; the role of the Department of Labor, the Comptroller General, and the contracting agencies in interpretation, administration, and enforcement of these statutes. (Examination) (Spring—evening)

443 **Labor Relations in the Federal Service** (2) Tobias

Survey of labor relations in the federal service as governed by Executive Order 11491. Emphasis on the role of the Civil Service Commission, the Department of Labor, the Congress, and the President in the development of collective bargaining relationships between unions and the federal government. (Research Paper) (Fall—evening)

444 **The Individual and His Union** (2) Gold

Study of the legal relations between unions and their members with special emphasis on the right to fair representation, the right to union membership, compulsory union membership, the imposition of discipline upon union members, reporting requirements, the conduct of internal union elections, the fiduciary duties of union officers, the imposition of trusteeships, the regulation of racketeering, and political action of unions. Prerequisite: Law 341 (Examination) (Summer 1971)

445 **Labor Relations in State and Local Governments** (2) Jascourt

Analysis of the shifting and emerging legal concepts that affect the form, scope, and consequences of labor relations in schools and colleges and in municipal, county, and state governmental bodies. Survey of the varied statutory and de facto labor relations systems and their impact on the development of bilateral decision making. Examination of (1) problems caused by the concurrent existence of civil service laws and the diffusion of governmental authority, (2) impasse resolution, and (3) strikes and other concerted activities. (Research Paper) (Spring—evening)

447 **Seminar: Labor Law** (2) Merrifield

Group study of contemporary problems in labor law. (Research Paper) (Spring—day)

449–50 **Seminar: Labor Litigation** (1–1) Gold

Intensive study of recent Supreme Court and appellate court decisions in the area of labor law; special emphasis on the contrasting variables which influence the respective decision-making processes of the National Labor Relations Board and the courts. Particular attention to labor law cases pending before the Supreme Court for decision during the current term. Analyses of the briefs filed in pending cases; attendance at oral argument; post mortems of the arguments and decisions, with classroom participation by attorneys involved in some cases. Grades and credit for both halves of the course assigned only on completion of the second half. Prerequisite: Law 341. (Research Paper) (Academic year: every other week—evening)

Master of Laws candidates in the area of Labor Law who have not taken the following courses or their equivalent as part of a Juris Doctor or Bachelor of Laws program should include them in their Master's program.

339 *Collective Bargaining and Labor Arbitration*
341 *Labor Law*

OTHER RELATED COURSES

459 *Problems of the Consumer*
460 *Current Problems in Civil Rights*
461 *Social Welfare Legislation and Administration*

LAW AND POVERTY

Faculty Advisers: R.S. Kuhn, D.P. Rothschild, J.E. Starrs

451 **Federal Programs for Urban Poverty** (2)

Study of the legislative and administrative process by which particular urban problems are converted into a grant of statutory authority, an op-

erating program, and finally a funded project in a given city. Areas considered will be employment and job training programs such as USES and vocational education programs, the Manpower Development and Training Act, Job Corps, and Neighborhood Youth Corps, elementary and secondary education programs such as Titles I and III of the Elementary and Secondary Act; and the Community Action and Model Cities programs. (Examination) (Fall—day)

458 **Housing the Poor** (2) Starr

An in-depth analysis of current housing problems, including three main subjects: (1) Discrimination in housing. (2) Landlord and tenant relationship, including a discussion of leases and their clauses and of the eviction process, tactical and substantive defenses to it, and affirmative avenues of redress on behalf of the tenant; public housing and building code enforcement. (3) Home ownership by the poor, including its financing by instruments such as the deed of trust and the installment land contract as well as federal subsidy programs. Admission by permission of instructor. (Research Paper) (Spring—day)

459 **Problems of the Consumer** (2) Rothschild

Clinical treatment of consumer protection. No regular classes; minimum of 5 hours commitment each week required. Students purchase materials on consumer protection and are divided into project groups for the purpose of indicating the problems of the consumer to the community by a campaign of consumer awareness. For example, the National Law Center has negotiated with a commercial TV station to put on a series of "spots" dramatizing these problems, and will also run a "Consumer Help Center." This activity will involve three groups: (1) a group to work with the station on programming, (2) a group to run the Consumer Help Center, and (3) a research group to investigate the results of turning complaints over to the appropriate authority. Another student project will dramatize problems of the consumer by teaching consumer awareness in the public school system in the District of Columbia. Other projects are also available. Students registering for Law 459 who have taken or plan to take Law 399 are reminded that a maximum of 10 semester hours of credit may be earned in these courses—Law 346, 399, 459, and 509. The grade of *CR* (credit) or *NC* (no credit) is given for this course. (Research Paper) (Fall and spring—day)

460 **Current Problems in Civil Rights** (2) Kuhn

Uses of law in the effort to achieve racial equality, in areas such as (1) discrimination against minority groups and the poor in land use and zoning, (2) school desegregation, and (3) employment discrimination. The class is divided into groups, each dealing with a problem situation in one of these areas. Students represent fictitious clients, write briefs, and argue in class before a student panel of judges, which then writes an opinion. Grades are based on these written and oral presentations, plus brief critiques of other groups' presentations. (Problem Assignments) (Spring—day)

461 **Social Welfare Legislation and Administration** (2)

Study of public assistance, social insurance, and medical and legal assistance programs; the socioeconomic status of welfare recipients, the psychological impact of the welfare system, and the "Welfare Rights Movement"; particular legal issues, such as "midnight searches" and the Fourth Amendment, imposition of support obligations on non-fathers through the

"Man-in-the-House Rule," imposition of moral behavior standards through welfare denial, right of privacy, and Constitutional issues raised by mandatory training or work requirements. (Research Paper)

462 **Family Law of the Poor** (2)

Consideration of the full range of problems associated with family formation and dissolution among the urban poor and the problems of urban children and their parents: the law of marriage, annulment, divorce, and separation as it affects the poor urban family unit; impact on the family of welfare and public housing eligibility regulations; legal problems associated with common-law marriage, illegitimacy, and meretricious relationships; scope of support obligations and sanctions imposed through welfare denial or eviction from public housing; organization of social services and their role in the solution of family problems; and the lawyer's role in family counseling. (Research Paper)

OTHER RELATED COURSES

441 *Seminar: Disability and Retirement Problems*
472 *Administration of Criminal Justice*
475 *Law and Criminology I: Search for the Causes of Criminal Behavior*
476 *Law and Criminology II: Society's Responses to the Criminal Offender*
477 *The Police and the Community*
560 *Taxation—State and Local*
571 *Land Use Planning*
575 *Economic Development Planning for the Inner City*
590 *Population Control and the Law*
592 *Seminar: Constitutional Law*

LAW, PSYCHIATRY, AND CRIMINOLOGY

Faculty Advisers: R.C. Allen, T.F. Courtless, Jr., E. Ferster

472 **Administration of Criminal Justice** (2) Allen

Consideration and analysis of selected advanced problems in the administration of criminal justice. The subject matter covered will vary from year to year, with concentration in areas of current interest and dynamic change (e.g., right to counsel, arrest and interrogation, search and seizure, prejudicial publicity, discovery, electronic interception, mental impairment). Emphasis will be placed on the role and professional responsibilities of prosecutor and defense counsel and on developmental trends in the law. (Research Paper or Examination)

475 **Law and Criminology I: Search for the Causes of Criminal Behavior** (2) Courtless

Role which criminological knowledge of crime causation may play in assisting lawyers to appraise the effectiveness of various alternative social and legal devices in controlling deviant behavior. The search for factors related to criminal behavior will be developed historically, with emphasis on current causal theories developed by various disciplines. Model as well as operational penal codes, sentencing and probation practices, and specialized facilities will be analyzed in terms of their relationship to such casual theories. (Take-home Examination)

476 **Law and Criminology II: Society's Responses to the Criminal Offender** (2) Courtless

Study of the development and current use of society's three maior approaches to the handling of offenders: punitive, mechanical, and correctional. Emphasis on society's changing responses to criminal and delinquent behavior, and research findings concerning effectiveness of these responses. Analysis of treatment strategies to facilitate communication between members of the legal profession and behavior scientists charged with effectuating these strategies. (Research Paper)

477 **The Police and the Community** (2) Allen, Courtless

Problems and potential of contemporary urban law enforcement: the role and perspective of the police officer; the police *qua* organization; "styles" of law enforcement: law enforcement in the inner city; relationship with ethnic minorities; civil disorder; police-community relations; methods in arrest and investigation; complaint review procedures; science and technology in law enforcement; police handling of juveniles; crime and crime statistics. (Problem Assignments) (Spring—day)

478 **Post-conviction Dispositions—Dynamics of the Law of Criminal Corrections** (2) Barkin, Skoler

Study of the statutes, practice, problems, and potentials of the alternatives facing a defendant including: mental fitness to proceed to trial, probation, sentencing, parole, correctional institutions, rights of prisoners. (Examination) (Fall—evening; spring—day)

486 **Seminar: Law and Psychiatry** (2) Allen

Designed to (1) expose the lawyer to some of the constructs of dynamic psychiatry dealing with human personality and behavior, and to relate them to problems encountered in legal practice; (2) provide information —both psychiatric and legal—bearing upon such topics as mental illness and tort liability ("traumatic neurosis," malpractice, commission of torts by mentally ill persons); hospitalization of the mentally ill and mentally retarded; guardianship; ad hoc determinations of incompetency (testamentary, contractual, and donative capacity; capacity to marry, have custody of children; mental illness as a ground for divorce; eugenic sterilization); mental illness and the criminal law (psychiatric evaluations in criminal cases, determinations of competency to stand trial, criminal responsibility); and (3) examine the role of psychiatry in legal settings, including the effective use of the psychiatrist and psychologist as expert witness. (Research Paper) (Fall—day; summer 1971)

487 **Interdisciplinary Seminar on the Juvenile Court** (2) Fenster

Sociological, psychological, and psychiatric views on prevention, diagnosis, and treatment; analysis of statutes, court rules, and reported cases pertaining to delinquency and neglect; emphasis on the role of the lawyer in juvenile courts. (Problem Assignments) (Spring—day)

OTHER RELATED COURSES

390 *Forensic Medicine*
591 *Legislative Drafting*
592 *Seminar: Constitutional Law*

LAW, SCIENCE, AND TECHNOLOGY

Faculty Adviser: H.P. Green

491 **Science Policy Formulation** (2) Anderson

Current or recent important governmental decisions in the area of science as they affect the interplay of various government and community interests: the role of law as a constraint, vehicle, or implement; the role of lawyers in the decision-making process. (Research Paper)

492 **Seminar: Science and the Legal Process** (2) H. Green

Reciprocal relationships between law and science: absorption of scientific concepts into substantive law through adjudication, legislation, and rule making; techniques and procedures used in handling, developing, and deciding scientific issues. (Research Paper) (Fall—evening)

493 **Intergovernmental Aspects of Technological Change** (2)

Role of technology in breaking down political barriers and leading to intergovernmental measures to control or advance technological progress within the United States and on an international basis. Specific legal devices and institutions employed in intergovernmental handling of technological problems. (Research Paper)

494 **Use and Control of Atomic Energy and Space Technology** (2) Gleason

Problems resulting from revolutionary scientific developments of recent years. Impact of advanced technologies on the law and legal institutions. Laws and regulations relating to atomic energy and space including civilian uses, licensing, security, international, and patent considerations. (Research Paper) (Fall—evening)

495 **Legal Protection against Technological Hazards** (2) Dembling, J. Brown

The growth and development of law and legal institutions to protect society against the hazards inherent in new technologies with particular emphasis on the progress of reconciling the protection of the public with the desire for rapid progress. (Research Paper) (Spring—evening)

OTHER RELATED COURSES

380 *Environmental Law I*
381 *Environmental Law II*
402 *Executive Function*
412 *Food and Drug Law*
413 *Public Policy and Mass Media*
431 *Government Procurement Law*
503 *Natural Resources Law and Policy*
505 *Intergovernmental Relations I*
531 *International Law of Air and Space*
532 *International Law of the Sea*

NATURAL RESOURCES LAW AND ENVIRONMENTAL LAW

Faculty Advisers: J.M. Brown, H.P. Green, A.W. Reitze

501 **Land Development Law** (3) J. Brown

Study of the various techniques relative to land development; the status of the federal government as landlord, vendor, and purchaser; the competitive private market as a form of planning in comparison to governmental planning programs; the functions of the lawyer in the modern real estate transaction involving land acquisition, licenses, codes and permits, development, construction, sale, and financing. Consideration of new forms and concepts of ownership, transportation programs as a part of land development planning, the migration of people and industry as a planning and control factor, and private and public "new town" developments. (Research Paper) (Fall—day; summer 1971)

502 **Water Resources** (3) Reitze, Cunningham

Introductory survey course in the law relating to water resources. History and development of water rights systems in the United States using a comparative analysis of Eastern and Western water law doctrines, the trend toward their modification, and study of the increasing influence of federal laws and projects. Consideration of private and public rights to both consumptive and nonconsumptive uses; analysis of pollution and other water quality problems and their interrelationships with the total demand for water and other natural resources. Identification of federal-state-local relationships, conflicts, and institutions; consideration of river-basin management and interbasin transfers; description of proposed creation of new sources. (Examination) (Fall—day; summer 1971)

503 **Natural Resources Law and Policy** (2) Kratchman

Study of key legal doctrines and their development in the law of water, mining, and oil. Systematic analysis of natural resource problems such as government and private interactions, multiple use and priorities of resources, and security of property rights. Examination of alternatives in resource policy development, and impact on private and public actions. (Research Paper) (Fall—evening)

505 **Intergovernmental Relations I** (2) Nash

Study of federalism, emphasizing current techniques for achieving cooperation and coordination between federal, state, and local governments. Detailed consideration of devices used, including interstate compacts, grants-in-aid, and exercise of regulatory powers. (Writing Assignments) (Fall—day)

506 **Intergovernmental Relations II** (2) Nash

Advanced seminar on multi-government activities and current topics on intergovernmental relations. (Research Paper) (Spring—day)

508 **Environmental Litigation** (2) B. Cohen

Special problems of environmental lawsuits. Topics include pleadings, procedural problems, selection of the proper court, problems of proof, remedies, selection of parties, discovery techniques and trial preparation, and the use of expert witnesses and scientific evidence. (Examination) (Spring—evening)

509 **Clinical Studies in Environmental Law** (2 or 3 or 4) Reitze

The student works on a project in the environmental law field under the supervision of both the faculty director of the program and a lawyer practicing environmental law. The project may involve working with a government agency; a congressional committee; a private practitioner; or a nonprofit, public-interest, environmentally oriented organization. The aim of the course is to have the student produce a serious piece of professional work under close supervision. Admission to this course requires third-year or graduate standing and permission of the Director of the Environmental Law Program. Students who have mastered the fundamentals of environmental law are selected for this course. Normally this will require completion of at least Law 380. In addition, consideration will be based on the other environmentally related courses taken including those in Natural Resources Law and in Law, Science, and Technology as well as work experience and other demonstrated interest in environmental law. Students may repeat this course for a maximum of 8 semester hours of credit. The grade of *CR* (credit) or *NC* (no credit) is given for this course. (Fall and spring—day)

Master of Laws candidates in the area of Natural Resources Law and Environmental Law who have not taken the following courses or their equivalent as part of a Juris Doctor or Bachelor of Laws program should include them in their Master's program.

380 *Environmental Law I*
381 *Environmental Law II*

OTHER RELATED COURSES

403 *Public Economic Policy and the Law*
431 *Government Procurement Law*
491 *Science Policy Formulation*
492 *Seminar: Science and the Legal Process*
495 *Legal Protection against Technological Hazards*
532 *International Law of the Sea*
560 *Taxation—State and Local*
571 *Land Use Planning*
591 *Legislative Drafting*

PATENT AND TRADE REGULATION LAW

Faculty Advisers: L.J. Harris, I. Kayton, G.E. Weston

521 **International and Comparative Patent Law** (2) Federico

Origin of patent laws. Patent systems of major countries—United Kingdom, France, Germany, USSR, and others. Comparative topical survey: kinds of patents, inventors and applicants, subject matter, novelty, administrative procedures, oppositions, revocation, renewal fees, compulsory licensing infringement, etc. International Convention for the Protection of Industrial Property: origin, membership, organization, substantive provisions. Treaties in the making, Common Market patent system, Nordic Patent, Patent Cooperation Treaty, Council of Europe activities. Prerequisite: Law 359 or the equivalent in experience. (Take-home Examination) (Spring—evening)

522 **Patent and Know-How Licensing** (2) Finnegan

The business and legal criteria necessary to implement and maintain successful licensing programs; emphasis on the strategy and techniques that permit a proprietor of intellectual property to effectively exploit his status as the owner of a unique form of property. Subject areas covered are business objectives in licensing; legal outline of licensing situations; rights and duties of license parties; factors in selecting which inventions to license—financial, legal, and commercial; finding and selecting the right licensees; determining and negotiating the terms and clauses of the contract; administering and enforcing the license; antitrust and misuse constraints on the business and law of licensing; tax factors affecting the patent and know-how contract; special problems in trade secret, know-how, and show-how contracts; international licensing. Prerequisite: Law 359. (Spring—evening)

523 **Court Review of Patent Office Decisions** (2) Dunner

Procedure and procedural law involved in appealing to the U.S. Court of Customs and Patent Appeals and the U.S. District Courts from administrative decisions in the U.S. Patent Office. Designed to provide an exhaustive step-by-step procedural progression through *ex parte* and *inter partes* patent and trademark appeals. Emphasis on the forms used in the many motions and proceedings before the U.S. Court of Customs and Patent Appeals and the District Courts required to perfect an appeal. Attendance at and critique of actual court proceedings. Introductory material includes administrative appeals before the U.S. Patent Office Board of Appeals. Prerequisite: Law 359 and 362, or former Law 360, or the equivalent in experience. (Examination) (Fall—evening)

525 **Copyright Law** (2) Cary

Historical background; formalities and essentials in securing a copyright; subject matter of copyright; remedies; international aspects of copyright under Berne Union, Universal Copyright Convention, Inter-American Convention; copyright licensing and performing rights societies. (Examination) (Spring—evening)

526 **U.S. and International Trademark Practice** (2) Offner

Registerability and enforcibility of trademarks and tradenames in the United States and in several foreign countries. Procedural and substantive law necessary to advise as to what names and marks are registerable in the United States and the detailed procedure to be followed before the U.S. Patent Office in obtaining federal registration. A comparative law approach with respect to procedures for registration in foreign countries. Legal considerations with respect to licensing trademarks and tradenames internationally. Prerequisite: Law 329. (Examination) (Fall—evening)

527 **Advanced Topics in Patent Law** (2) Harris

Multidisciplinary consideration in depth of current industrial-intellectual property problems; licensing and protection of industrial property; uses and abuses of patents; governmental regulation; protection and transactions abroad; international treaties and arrangements; role of patents, trademarks, and trade secrets in business; economic and social functions of patents, trademarks, and copyrights. Students are exposed to pertinent source materials, professional research methods and techniques. Opportunity for oral presentation and discussion of term papers prior to submission is provided to encourage instructional dialogue among students and the investigation and analysis of issues. Prerequisite: Law 359 and

362, or former Law 360; or the equivalent in experience. (Research Paper) (Spring—evening)

529 **Research in Patent, Trademark, and Copyright Law** (2) Harris

Prerequisite: Law 417, 527, and related courses; and a *B* average. Request in writing, with proposed outline of topic of research, must be submitted to the Dean at least one month prior to registration day. Work must be completed within the semester and paper submitted not later than last day of classes. Graduate students may repeat this course once for credit with the approval of the Dean. (Research Paper) (Fall and spring)

Master of Laws candidates in the area of Patent and Trade Regulation Law who have not taken the following courses or their equivalent as part of a Juris Doctor or Bachelor of Laws program should include them in their Master's program.

329 *Unfair Trade Practices*
330 *Federal Antitrust Laws*
359 *Patent Law*
362 *Patent Office Practice*

OTHER RELATED COURSES

412 *Food and Drug Law*
417 *Seminar: Trade Regulation*
427 *Legal Aspects of International Business Transactions*
431 *Government Procurement Law*
491 *Science Policy Formulation*
492 *Seminar: Science and the Legal Process*
493 *Intergovernmental Aspects of Technological Change*
541 *Seminar: European Common Market*
562 *Income Taxation of Foreign Business and Investment*

INTERNATIONAL LAW AND COMPARATIVE LAW

Faculty Advisers: International Law—W.T. Mallison; Comparative Law—J.M. Albert

531 **International Law of Air and Space** (2) Dembling

Study of the development of international law relating to the use of air space and outer space; analysis of air and space treaties in force; the role of various intergovernmental and nongovernmental international organizations; consideration of special problems such as liability resulting from space activities, space technology and arms control, and pollution and contamination of outer space; earth resources, sensing, etc. (Research Paper) (Fall—evening)

532 **International Law of the Sea** (2) Muys

International and domestic law affecting the allocation of authority over ocean space. Problems concerning internal waters, territorial seas, the high seas, contiguous zones, and the continental shelf; the impact of advances in ocean science technology on ocean resource law; freedom of the sea, maritime safety, and related subjects. (Research Paper) (Spring—evening)

533 **Legal Regulation of International Coercion** (2) Mallison

Process of legal decision during war and at times when expectations of violence are high—contemporary international law of war and coercive measures short of war, such as limited naval blockade; legal aspects of modern methods of coercion—economic, political, psychological, and military; limited war and modes of preventing "escalation" to total war; regulation of hostilities including protection of war victims, civilian persons, and prisoners of war; war crimes and punishment; problems concerning weapons of mass destruction; and problems of transforming coercion situations to minimum order ones. (Research Paper) (Fall—evening)

535 **Negotiation: Concepts and Techniques** (2) Ramundo, Baruch

Role of the lawyer and policy maker (client) in private, intragovernmental, and international negotiations; negotiations in private practice and governmental operations; achievement of consensus among contentious parties; negotiating techniques, including effective use of the "fallback"; gaming exercises in the actual conducting of negotiations, with practical work in the preparation of claim letters, agency and national positions, and negotiating instructions. (Research Paper) (Spring—evening; summer 1971)

536 **Diplomatic and Consular Law and Practice** (1) Mitchell

Development of diplomatic and consular relations between nations; legal rights, privileges, functions, and immunities of diplomatic and consular personnel; extent of immunity from jurisdiction of foreign governments, missions and representatives; problems of taxation affecting foreign government missions and personnel. (Research Paper) (Spring—evening)

537 **The International Law of Human Rights** (2) del Russo

Theory of fundamental freedoms from its philosophical to its legal formulation in the American and French Revolutions, the individual, vis-a-vis, the State, human rights as rights against the national government, the emerging of the individual in the law of nations as a subject of rights and duties, the individual as subject of international concern, social and political forces stressing the need for international recognition and protection of human rights, the setting of human rights standards. The Universal Declaration and its influence over the law of nations, critical assessment of the work of the UN in the human rights field, regional approach to the international protection of human rights, analysis of the case-law of the European Convention, human rights in the Inter-American system, state sovereignty and the international protection of human rights, a comparative approach to human rights' protection at the national level, due process and freedom of speech in light of different legal systems. (Research Paper) (Spring—day)

540 **Comparative Conflict of Laws and Transnational Legal Problems** (2) Delaume

Adjudicatory jurisdiction, recognition and enforcement of foreign judgments in England and the Common Market countries; choice of forum clauses; transnational commercial arbitration; the Convention on the Settlement of Investment Disputes between States and Nationals of Other States; sovereign immunity; international judicial assistance; proof of foreign law; transnational contracts and stipulations of applicable law. Prerequisite: Law 309. (Research Paper) (Spring—evening)

541 **Seminar: European Common Market** (2) Belman

Analysis of treaty establishing European Economic Community; institutions of EEC and of member states and the internal law of member states as they affect doing business in EEC; series of problems arising out of establishing and operating business with and within EEC. Background in international law and antitrust law desirable. (Problem Assignments) (Fall—evening)

542 **Seminar: International Technical and Economic Assistance** (2) Aufricht

Technical and economic assistance activities of the United States, the United Nations, and specialized agencies; problems of law, policy, program, and administration; development planning; public and private transactions and institutions involving technical or economic assistance. (Research Paper) (Fall—evening)

546 **Soviet Law** (2) Ramundo

Concept of "socialist legality"; legal relationship of individual to state and other participants in Soviet society; role of Party in Soviet legal system; Soviet philosophy of law; state (constitutional) law: Soviet federalism, governmental apparatus, rights and obligations of citizenship; criminal law; property law; labor law; selected topics in civil law and procedure; international law. (Choice of Paper or Examination) (Fall—evening)

547 **Chinese Law** (2) Hsia

Emphasis on the legal system of Communist China: analysis of the constitutional law of the People's Republic of China, including general principles, state structure, and rights and duties of citizens; a brief survey of the administration of justice—courts, procuratorates, and lawyers; marriage law; land law; counterrevolutionary act and other criminal statutes; principles of civil law; Communist Chinese concept of international law. (Research Paper) (Spring—evening)

548 **Law of the Near East** (2) Liebesny

Law of the Arab countries, Turkey, and Iran, including basic principles of Islamic law, analysis of the present day codes, and investigation of the Western influences on laws of these countries. (Examination)

Master of Laws candidates in the area of Public International and Comparative Law who have not taken the following courses or their equivalent as part of a Juris Doctor or Bachelor of Laws program should include them in their Master's program.

302 *Admiralty*
303 *International Law and World Order*
307 *Comparative Law*
309 *Conflict of Laws*
391 *United Nations Law and World Order*

OTHER RELATED COURSES

427 *Legal Aspects of International Business Transactions*
494 *Use and Control of Atomic Energy and Space Technology*
505 *Intergovernmental Relations I*
506 *Intergovernmental Relations II*

521 *International and Comparative Patent Law*
562 *Income Taxation of Foreign Business and Investment*

TAXATION

Faculty Advisers: J.R. Hambrick, D.B. Weaver

551 **Taxation—Partnerships and Subchapter S** (2) Lanaha

Income tax problems of partnerships and tax-option corporations (Sub-chapters K and S of the Internal Revenue Code of 1954). Prerequisite: Law 336. (Examination) (Spring—evening)

553 **Seminar: Estate Planning** (2) Weaver, Speiller, Horowitz

Study of the effective disposition of wealth by inter vivos gift and testamentary transfer; emphasis on income, estate, and gift tax considerations; use of the trust form in the transfer of wealth; use of insurance and jointly held property as part of the estate plan; planning for the continuation or disposition of the client's business interests. Preparation of an estate plan, with supporting documents is the major project for the course. Prerequisite: Law 338. (Problem Assignments) (Spring—day and evening; summer 1971)

555 **Taxation—Special Corporation Problems** (2) Schoeneman

Detailed study of the principal federal tax benefits of the corporate form of doing business. Consideration of problems involved in the tax planning of the corporate structure and corporate operation, including the tax definition of a corporation, the special deductions available to corporate payers, the compensation of the corporate executive and employee, the debt-equity question, the accumulated earnings tax, the personal holding company tax, multiple corporations, and consolidated returns. Survey of the types of corporations receiving special treatment under the Internal Revenue Code, such as financial institutions, real estate investment trusts, regulated investment companies, cooperatives, and small business corporations. (Research Paper)

557 **Taxation—Exempt Organizations** (2) Treusch

Tax-exempt organizations: policy and practice of preferred tax treatment for selected organizations and gifts to them. Statutes, regulations, and IRS practice; legislative origins, judicial interpretations, and policy consideration. Tests of qualification, disqualification, and limited tax preference. Mechanics of securing and retaining exemption; qualified exemption; unrelated business income; private inurement, political activity. Denial or loss of exemption. Return and reporting requirements. Comparative tax treatment of nonexempt and nonprofit organizations. Special sanctions with respect to private foundations, managers, and donors for improper, excessive, or prohibited activities. Prerequisite: Law 336 (Examination) (Fall—evening)

558 **Taxation—Real Estate and Income** (2) Tucker

The effect of income taxes on the real estate market and real estate transactions: sales and exchange of real estate interests; various entities for the ownership and development of real estate; the impact of taxes on the landlord and tenant; the impact of taxes on the mortgagor and mortgagee, including the choice of financing techniques, such as the sale-leaseback; depreciation, amortization, and obsolescence; basis and basis adjustments; and casualties and other involuntary conversions. (Examination) (Fall—evening)

559 **Taxation—Oil and Gas** (2) Hambrick

Application of federal income tax law to producing segment of oil and gas industry. Classification of interests; treatment of exploration and development expenditures. Depletion allowance and concept of "economic interests." Sales and "ABC" transactions. Organization problems. Prerequisite: Law 336. (Examination)

560 **Taxation—State and Local** (2)

Taxation by state and local governments; problems of real and personal property taxation, sales and use taxes, business and personal income taxes. Limitations on taxation of interstate commerce. Congressional problems. Prerequisite: Law 336. (Problem Assignments and Choice of Paper or Examination) (Spring—evening)

562 **Income Taxation of Foreign Business and Investment** (2) Hambrick

The provisions and policies of the federal income tax law applicable to foreign income, including considerations affecting the choice of methods of engaging in foreign business and investment, treatment of controlled foreign corporations, allocation of income in foreign commerce, credit for foreign taxes, principles and trends of U.S. tax treaties. (Examination) (Spring—evening)

564 **Seminar: Special Problems of Tax Policy** (2) Ellicott

Intensive study of selected aspects of the tax structure with primary attention given to the federal income tax. Problem areas are reviewed primarily from the standpoint of tax policy, including legal, economic, social, and practical considerations. Alternative solutions, including current legislative proposals, are examined. Prerequisite: Law 336, 340. (Research Paper) (Fall—evening)

567 **Seminar: Tax Practice and Procedure** (2) Kapp, Troyer

Review of the major areas of tax practice, including organization of the Internal Revenue Service, legislation, administrative regulations, tax planning, tax rulings, tax audit, settlement procedures, claims for refund, tax collection processes, criminal tax practice, and ethical problems in tax practice. Preparation of various documents is required. Prerequisite: Law 336. (Problem Assignments) (Fall and spring—evening)

568 **Seminar: Federal Tax Litigation** (2) Treusch

Choice of forum. Conduct of civil tax cases: trial practice in the Tax Court, the District Courts, and the Court of Claims; appeal practice in the Courts of Appeals and on certiorari to the Supreme Court; analysis and drafting of pleadings, motions, and briefs; oral argument; settlements and stipulations of fact. Comparative responsibilities and procedures of IRS and of Justice for litigation control. Prerequisite: Law 567. (Writing Assignments) (Spring—evening)

Master of Laws candidates in the area of Taxation who have not taken the following courses or their equivalent as part of a Juris Doctor or Bachelor of Laws program should include them in their Master's program.

336 *Taxation—Federal Income*
338 *Taxation—Federal Estate and Gift*
340 *Taxation—Federal Income, Corporations and Shareholders*
351 *Law and Accounting*

OTHER RELATED COURSES

403 *Public Economic Policy and the Law*
404 *Securities Regulation*
424 *Business Planning*
427 *Legal Aspects of International Business Transactions*

URBAN LEGAL STUDIES

Faculty Advisers: R.S. Kuhn, C.B. Nutting, M. Pock, D.P. Rothschild

571 **Land Use Planning** (2) Nutting
Selected problems in urban redevelopment and housing, with particular emphasis on programs under current federal and state legislation. (Research Paper) (Spring—day)

575 **Economic Development Planning for the Inner City** (2) Stevenson
A substantive study, using a problem format, of alternative forms of organization for community economic development, including unincorporated associations, partnerships, nonprofit corporations, cooperative corporations, and profit corporations. Analysis of the corporate, financial, tax, and securities aspects of organizing a nonprofit action group, organizing and operating a neighborhood business, and developing additional housing. Prerequisite: Law 312. (Problem Assignments) (Spring—day)

Descriptions for the other courses in this area (listed below) appear elsewhere in "Advanced Courses."

451 **Federal Programs for Urban Poverty** (2)

458 **Housing the Poor** (2)

459 **Problems of the Consumer** (2)

461 **Social Welfare Legislation and Administration** (2)

501 **Land Development Law** (3)

505 **Intergovernmental Relations I** (2)

506 **Intergovernmental Relations II** (2)

560 **Taxation—State and Local** (2)

Master of Laws candidates in the area of Urban Legal Studies who have not taken the following course or its equivalent as part of a Juris Doctor or Bachelor of Laws program should include it in their Master's program.

349 *Local Government Law*
445 *Labor Relations in State and Local Governments*
477 *The Police and the Community*

OTHER RELATED COURSES

460 *Current Problems in Civil Rights*
462 *Family Law of the Poor*

475 *Law and Criminology I: Search for the Causes of Criminal Behavior*
476 *Law and Criminology II: Society's Responses to the Criminal Offender*
487 *Interdisciplinary Seminar on the Juvenile Court*
592 *Seminar: Constitutional Law*

OTHER ADVANCED COURSES

590 **Population Control and the Law** (2) — Miller

Consideration of the concept of an "optimum" population through an examination of existing statutes which encourage or discourge population growth; relevant Supreme Court cases; international policies of a public law nature leading to population stabilization; and proposed legislation. (Research Paper)

591 **Legislative Drafting** (2) — Zweben

Advanced instruction and practice in legislative drafting. (Problem Assignments) (Spring—evening)

592 **Seminar: Constitutional Law** (2) — Dixon, H. Green

Group study of contemporary problems in constitutional law; process of constitutional litigation; problems of effectuating constitutional guarantees. (Research Paper)

593 **Seminar: American Legal History** (2) — D. Green

From the outbreak of the Revolution at Lexington and Concord to the death of John Marshall. An examination of men, events, and movements significant in the unfolding of our laws and legal institutions in this formative period of our national life, including a critical examination of the place of the lawyer in a revolutionary age. Comparison of the role of the lawyer during the politically and socially unsettled time of Marshall with the role of the lawyer in today's troubled scene. Each member of the seminar presents the results of his research and thought either by an oral or by a written report. The grade of *CR* (credit) or *NC* (no credit) is given for this course. (Research Paper) (Fall and spring—day)

595 **Seminar: Supreme Court Practice** (2) — Gressman

Study of the jurisdiction, practice, and procedure of the Supreme Court of the United States. Certiorari and appeal; the Court's Rules of Practice; how to prepare petitions and jurisdictional statements; the internal operation of the Supreme Court; other related aspects of Supreme Court practice, such as bail and stay applications, use of extraordinary writs, motions practice, oral argument, and briefing; *in forma pauperis* procedures. Students will prepare documents used in Supreme Court practice—petitions for certiorari, jurisdictional statements, and opposing briefs and arguments —using the actual conference list of cases pending before the Court. (Research Paper) (Spring—day)

596 **Seminar: Contracts** (2) — Freedman

Advanced problems in contracts, such as the relationship of contract and tort (substantively, procedurally, and in measuring damages), Article II of the Uniform Commercial Code, product liability, commercial frustration, unconscionability, remedies, anticipatory breach, consumer's rights, and professional responsibility of the civil practitioner. Hours arranged at the convenience of the students. Admission by permission of instructor. (Research Paper) (Spring—day)

598 **Research in Public Law** (2) Staff

Registration limited to students with at least a *B* average who have had a seminar or comparable course in field of proposed research. Request in writing, with proposed outline of topic of research, must be submitted to the Dean at least one month prior to registration day. Work must be completed within the semester and paper submitted not later than last day of classes. Students may repeat this course once for credit with the approval of the Dean. (Research Paper) (Fall and spring)

599–600 **Thesis** (2–2)

Students must register for two successive semesters. (Fall and spring



SPECIAL PROGRAMS IN RESEARCH AND INSTRUCTION

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Director John Cibinic, Jr.
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A COMPREHENSIVE GOVERNMENT CONTRACTS PROGRAM provides continuing instruction for industry and government personnel in this field and a program of courses leading to the Master of Laws degree in Government Procurement Law. The program includes (1) short seminars; (2) one-week courses in advanced problems in the field; (3) an annual institute treating a problem of contemporary importance; (4) an annual conference in a major area; (5) compilation of materials for use in current courses; (6) publication of a series of monographs treating special problems in the field; and (7) special research projects.

COMPUTERS-IN-LAW INSTITUTE

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The Computers-in-Law Institute is coping with the problems posed by the advent of computers in the practice and theory of law. Projects are underway for the purpose of advancing the state of knowledge and pedagogical techniques connected with the law-computer interface. Major areas of current activity and interest include legal protection of computer programs (programs are the instructions by means of which the user instructs the machine to perform his tasks); antitrust problems in the computer industry; computerized legal information retrieval systems; automatic composition of legal publications; systems studies oriented toward preserving the privacy of the individual in connection with large computerized data centers; computerization of land records and mechanization of routine court administration; and the application of computer techniques to a generalized reapportionment procedure. Other areas of interest include the impact of the computer on taxes and telecommunications. Current educational programs include the annual "Law of Software Conference" and the "Computers and Tax Conference."

INSTITUTE OF LAW, PSYCHIATRY, AND CRIMINOLOGY

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The Institute of Law, Psychiatry, and Criminology draws upon the insights and techniques of the behavioral sciences in areas of mutual concern to law and its sister disciplines, with special emphasis in the fields of forensic psychiatry and criminology.

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The objective of the International Law Program is to provide a better understanding of how decisions in international law are actually made and the improvements which are needed in decision-making, sanctions processes, and accompanying legal institutions to promote the extension of the rule of law in the world community while considering the relationship between domestic and international law. The Program also includes the international aspects of business transactions and economic development. The objectives of the Program are implemented through course work and seminars for both J.D. and Post-J.D. degree students and through research and writing in the field.

LAW, SCIENCE, AND TECHNOLOGY PROGRAM

Director H.P. Green

The Law, Science, and Technology Program deals with the reciprocal relationships between law and science, providing courses, seminars, research studies, and publications to equip the legal profession to deal more effectively with the social, economic, political, and legal consequences of the nation's present massive commitment to scientific progress.



THE GEORGE WASHINGTON LAW ASSOCIATION

THE GEORGE WASHINGTON LAW ASSOCIATION was founded in 1912 and has been affiliated with the General Alumni Association since 1926. Its purposes as stated in the constitution are to promote high standards of legal education, to keep the alumni of the school in close touch with one another, especially with members of their own classes, to gather and publish at intervals information as to the whereabouts and activities of these alumni, and to further the interests of the school.

Eligible members are those who have matriculated in the school or National University and have left in good standing, and any member or former member of the faculty of the school. Active members are those eligible members who are current contributors to the Law Annual Support Program of the University and life members of the George Washington Law Association.

The Association plans publication periodically of the Law Alumni Directory. Law Alumni are urged to keep the Alumni Office informed of their whereabouts so that directory information can be kept up to date.

The Law Alumni Office is in Bacon Hall, 2000 H Street, N.W., Washington, D.C.

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THE UNIVERSITY

HISTORY AND ORGANIZATION

THE GEORGE WASHINGTON UNIVERSITY had its beginning in 1821 as The Columbian College in the District of Columbia. The name of the institution was changed in 1873 to Columbian University and in 1904 to The George Washington University. The debt of the University to George Washington, whose name it bears, is an intangible one.

George Washington, as President and as private citizen, had urgently insisted upon the establishment of a National University in the Federal City. There he hoped that, while being instructed in the arts and sciences, students from all parts of the country would acquire the habits of good citizenship, throwing off local prejudices and gaining at first hand a knowledge of the practice, as well as the theory, of republican government. To further the materialization of his hopes, Washington left a bequest of fifty shares of The Potomac Company "towards the endowment of a University to be established within the limits of the District of Columbia, under the auspices of the General Government, if that government should incline to extend a fostering hand towards it." The Congress never extended "a fostering hand." The Potomac Company passed out of existence, and Washington's bequest became worthless.

Fully conscious of Washington's hopes, but motivated primarily by a great missionary urge and the need for a learned clergy, a group of dedicated ministers and laymen sponsored a movement for the establishment of a college in the District of Columbia. Inspired largely by the zeal and energy of the Reverend Luther Rice, they raised funds for the purchase of a site and petitioned Congress for a charter. After much delay and amendment, Congress granted a charter which was approved by President Monroe on February 9, 1821. To safeguard the College's nonsectarian character it provided "that persons of every religious denomination shall be capable of being elected Trustees; nor shall any person, either as President, Professor, Tutor or pupil, be refused admittance into said College, or denied any of the privileges, immunities, or advantages thereof, for or on account of his sentiments in matters of religion."

During the entire time when the institution was known as Columbian College, its activities were centered on College Hill, a tract of forty-six and a half acres between the present Fourteenth and Fifteenth Streets extending north from Florida Avenue to somewhat beyond Columbia Road. The Medical School was located downtown. For the better part of the Columbian University period, the buildings of the University were situated along H Street between Thirteenth and Fifteenth Streets. The Medical School group still remains there.

During the last half century the University's present plant has been develop in that section of the old First Ward familiarly known as "Foggy Botto between Nineteenth and Twenty-fourth Streets, south of Pennsylvania Aven The area is not without its reminders of historic interest to the University. Pre ident Monroe, who signed the Charter, lived at 2017 Eye Street. The first Pre ident of the Board of Trustees, the Reverend Obadiah B. Brown, was for fi years the pastor of a church at Nineteenth and Eye Streets, and Washingt selected Twenty-third and E Streets as the site of the National University had hoped to see established.

The University as it is now organized consists of Columbian College of Ar and Sciences (undergraduate); the Graduate School of Arts and Sciences; th professional schools, which include the National Law Center and the schoo of Medicine, Engineering and Applied Science, Education, Government an Business Administration, Public and International Affairs; the College of Ge eral Studies; the Division of University Students; and the Summer Sessions.

The George Washington University is privately endowed and is governed b a self-perpetuating Board of Trustees of which the president is an ex offic member.

ACADEMIC STATUS

The George Washington University is accredited by its regional accreditin agency, the Middle States Association of Colleges and Secondary Schools. Th University is on the approved list of the American Association of Universi Women and is a member of the College Entrance Examination Board.

LOCATION

The University is in downtown Washington, between Pennsylvania Avenue an 19th, F, and 24th Streets, N.W. In immediately adjacent areas are the Wh House, the World Bank, the United States Information Agency, the Departme of the Interior, the Department of State, the General Services Administratio the National Academy of Sciences, and the Kennedy Center for the Performi Arts.

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THE NATIONAL LAW CENTER

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B.A. 1948, J.D. 1950, Washington University; LL.M. 1963, University of Michigan

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B.A. 1963, University of North Carolina at Chapel Hill; B.A. 1965, Oxford University, England; LL.B 1968, Harvard University

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B.S. in E.E. 1962, Massachusetts Institute of Technology; J.D. 1965, Columbia University

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B.A. 1940, University of Scranton; LL.B. 1943, Dickinson School of Law

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B.A. 1955, Tufts University; LL.B. 1958, Yale University; LL.M. 1960, George Washington University

Hurd Baruch, *Associate Professorial Lecturer in Law*
B.A. 1957, Hamilton College; LL.B. 1960, Yale University; M.B.A. 1961, Columbia University

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B.A. 1957, Cornell University; J.D. 1960, Harvard University

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B.A. 1943, University of Illinois; J.D. 1963, University of Florida

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Member of the bar of the District of Columbia

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B.S. 1932, University of Pennsylvania; J.D. 1938, George Washington University; LL.M. 1942, Georgetown University

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Alessandra Luini del Russo, *Professorial Lecturer in Law*
Doctor Litterarum 1939, University of Milan, Italy; Dr.Jur. 1943, University of Pavia, Italy; M.Comp.L. 1949, George Washington University

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Paul East, *Assistant Professorial Lecturer in Law*
Barrister-at-Law 1966, Gray's Inn, England; M.B., B.S. 1968, University of London, England; LL.M. 1970, George Washington University

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* On sabbatical leave fall semester 1971–72.
† On sabbatical leave 1971–72.

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Summary of Registration, Fall Semester 1970–71

	1st year	*2d year*	*3d year*	*4th year*	*Graduate*
Day	318	372	285	.....	99
Evening	106	120	92	92	360

Total: 1,844



APPENDIX: RECENTLY ESTABLISHED REGULATIONS

THE FOLLOWING UNIVERSITY REGULATIONS are under review and may be subject to change in connection with the establishment of judicial processes. Bulletins and handbooks incorporating any changes will be issued as appropriate.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on October 19, 1968:

Whereas, safety and order are essential preconditions of the learning process, and indeed of the very concept of a university; and

Whereas, The George Washington University is committed to protection of free speech and freedom of assembly, and to safeguarding the right of lawful protest on campus; and is committed equally to maintaining the peace and safety of the campus, in the knowledge that all rights are in jeopardy when violence and civil disorder prevail over law and reason;

Now, therefore, be it resolved by the Senate of The George Washington University: that in the event a demonstration at this University exceeds the bounds of free assembly and lawful advocacy, and demonstrators are engaging in unlawful acts which cause or imminently threaten injury to persons or property, or which obstruct or interfere with normal and necessary University activities, this body affirms the authority of the President, or other University officials designated to act in his absence, to take such reasonable steps, if possible after consultation with the Chairman of the Executive Committee of the University Senate and the President of the Student Body, as are required to restore and preserve order; including, if deemed necessary and appropriate, suspension of students or faculty engaging in such acts, and use of such law enforcement personnel as are needed to effect the removal, arrest, and prosecution of law violators. Any such suspension shall be reviewed by an appropriate tribunal as soon after order is restored as is practicably possible.

The following was approved by the University's Board of Trustees on October 19, 1968:

Any student suspended from The George Washington University on the grounds of exceeding the bounds of free assembly and lawful advocacy shall have his suspension reviewed by the Hearing Committee on Student Affairs of The George Washington University as soon after order is restored as is practicably possible.

The following resolution, submitted by the Student Life Committee, was approved by the University's Board of Trustees on October 19, 1968:

Be it resolved that The George Washington University: affirms its traditional commitment to freedom of expression (a) by continuing to permit business and government organizations which are recruiting employees to conduct their activities at designated places on campus, and (b) by placing no obstacle to students who may wish to protest the presence of such recruiters, provided, however, that such protest shall be orderly and shall not impede or disrupt the recruiter in his activities.

The University affrms its place as a forum for the free exchange of ideas (a) by assuring that guests invited to speak on this campus at duly scheduled meetings shall have the right to appear and to be heard, and (b) by sanctioning the freedom of students to express dissent from the views of the speaker, provided, however, that that expression of dissent be orderly and nonobstructive.

The University distinguishes between orderly protest and resistance-by-obstruction; it accepts the former as a legitimate expression of dissent while rejecting the latter as an abridgement of the freedoms of the individuals who may be its object.

The following was approved by the University's Board of Trustees on October 19, 1968:

The George Washington University is opposed to discrimination based on race, color, or creed. Such discrimination may have appeared in campus organizations in the past. In the future, however, no organization can be recognized or supported by the University unless it provides continued assurance of nondiscrimination in membership practices and in intent, considered adequate by relevant committees and officers of the University.

The following was approved by the University's Board of Trustees on October 19, 1968:

The University cannot condone violations of law, including violation of those laws which proscribe possession, use, sale, or distribution of certain drugs. Members of the academic community should know that administrative action, which may include dismissal from the residence halls, revocation of other privileges, or suspension or dismissal from the University, may be taken in order to protect the interests of the University and the rights of others.

The Board of Trustees reaffirms the responsibility of the President and the Faculty to continue to implement this policy.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on January 16, 1969:

Be it resolved by the Senate of The George Washington University: Any member of the University (including as members of the University all persons having a formal connection with the University)

(a) who engages in conduct that unreasonably obstructs teaching, research, and learning, or

(b) who unreasonably obstructs free access to members or guests of the University or to University buildings, or

(c) who disobeys general regulations of the University, or

(d) who damages University property or injures members or guests of the University,

may be punished for his conduct by dismissal from the University, or by some lesser disciplinary action, through procedures established within the University for the government of its members.

In order to insure due process, any student subject to dismissal or other disciplinary action on the grounds of violating any of the premises of this resolution shall have, at his discretion, the right of review of the action by the University Hearing Committee on Student Affairs.

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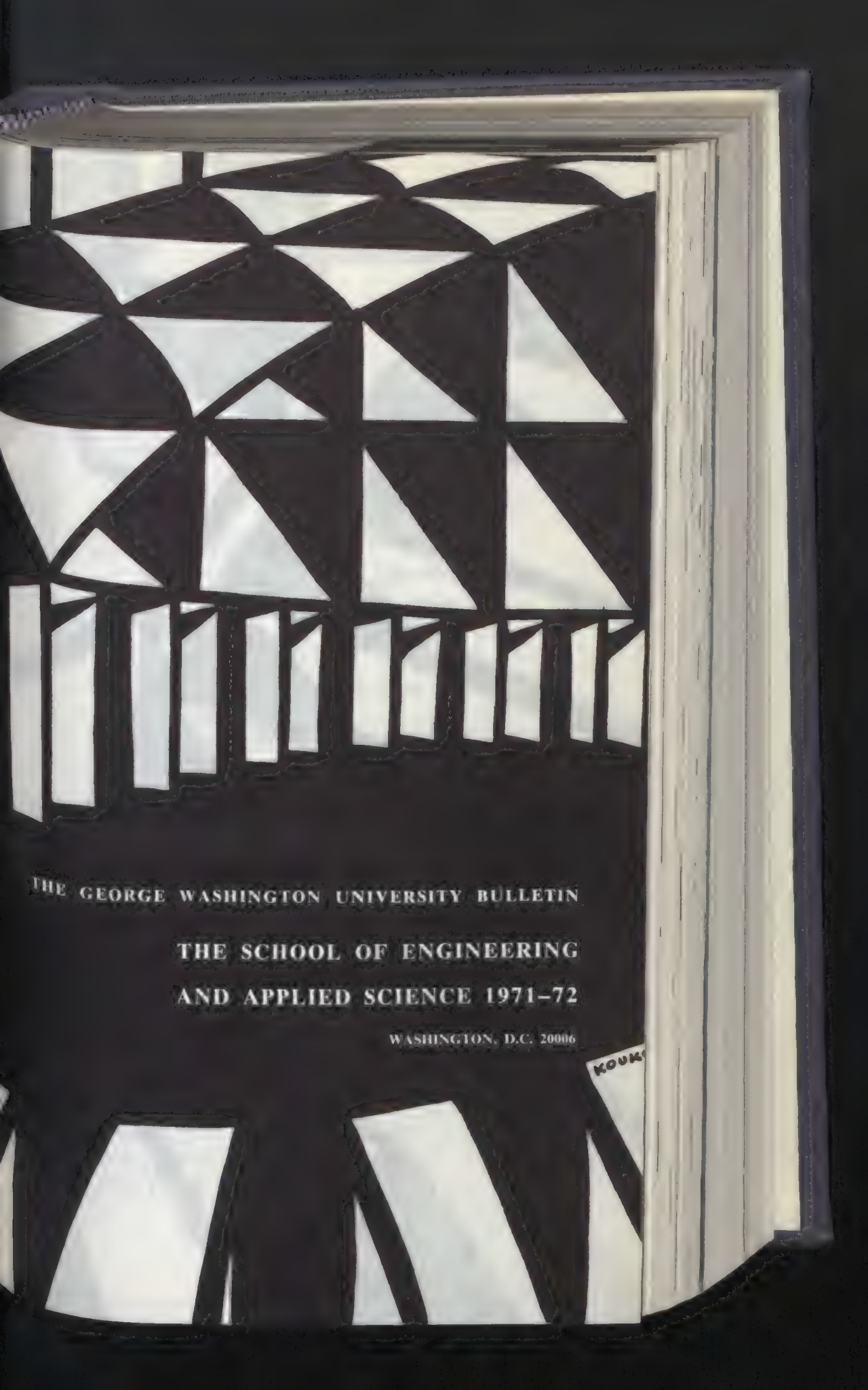


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THE GEORGE WASHINGTON UNIVERSITY BULLETIN

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE 1971–72

WASHINGTON, D.C. 20006



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THE CALENDAR 1971–72*

1971 SUMMER SESSIONS

June 14	Registration for first 5-week session and 8-week ... *Monday*
June 15	First 5-week session and 8-week courses begin *Tue...*
July 21	First 5-week session ends *Wednesday*
July 22	Registration for second 5-week session *Thursday*
July 23	Second 5-week session classes begin *Friday*
August 6	Eight-week courses end *Friday*
August 27	Second 5-week session ends *Friday*

1971 FALL SEMESTER

September 3	Orientation for students from foreign countries *Fri...*
September 7	Placement tests for entering students *Tuesday*
September 7–8	Advising for all students *Tuesday–Wednesday*
September 9–11	Registration—Tompkins Hall of Engineering *Thu... Saturday*
	Application for February Graduation due as ... registration
September 13	Classes begin *Monday*
September 20–21	No classes *Monday–Tuesday*
November 23	D.Sc. dissertations of February candidates due *Tue...*
November 24	Thanksgiving recess begins after last class *Wednesda...*
November 29	Classes resume *Monday*
December 6	Master's theses of February candidates due *Monday*
December 10	Last day of fall-semester classes *Friday*
December 13–22	Examination period *Monday–Wednesday*

1972 SPRING SEMESTER

January 17	Placement tests and waiver examinations *Monday*
January 17–19	Advising for all students *Monday–Wednesday*
January 20–22	Registration—Tompkins Hall of Engineering *Th... Saturday*
	Application for May graduation due as part of ... tion
January 24	Spring-semester classes begin *Monday*
February 21	Winter Convocation (holiday) *Monday*
March 21	D.Sc. dissertations of May candidates due *Tuesday*
March 25	Spring recess begins after last class *Saturday*
April 3	Classes resume *Monday*
April 14	Master's theses of May candidates due *Friday*
April 28	Last day of spring-semester classes *Friday*
May 4–13	Examination period *Thursday–Saturday*
May 28	Commencement *Sunday*

* This calendar is subject to change.

1971

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TO ALL PROSPECTIVE STUDENTS:

This catalogue describes the programs and requirements for undergradua
and graduate study in the School of Engineering and Applied Science. It al
includes descriptions of courses; a listing of the faculty and staff; and informa
tion on fees, financial regulations and aid, and student services and activitie

The School of Engineering and Applied Science is a professional school i
a university comprised of eight degree-granting schools and colleges. Th
environment of the Nation's Capital is very favorable for the intellectual a
cultural development of the student. The metropolitan Washington area co
tains the second largest concentration of research and development in th
United States, and the engineering component of this activity is similarl
extensive.

The School of Engineering and Applied Science has been in continu
session since 1884, and offers programs of study leading to Bachelor
Master's, and Doctor's degrees. Its prime objective is to educate the stud
so that he will have the precious asset of a well-trained mind which may
applied to the attainment of our many national objectives. In these chang
times, it is necessary to search for quality. Students and faculty are requir
to perform a certain amount of soul-searching. All should have the oppo
tunity of assisting in the planning and implementation of educational progra
Examination is being made periodically of the School's objectives and ho
they relate to those established by the American Society for Engineering
Education. Emphasis includes such items as the student's basic and advanc
levels of education and his role in present and future society.

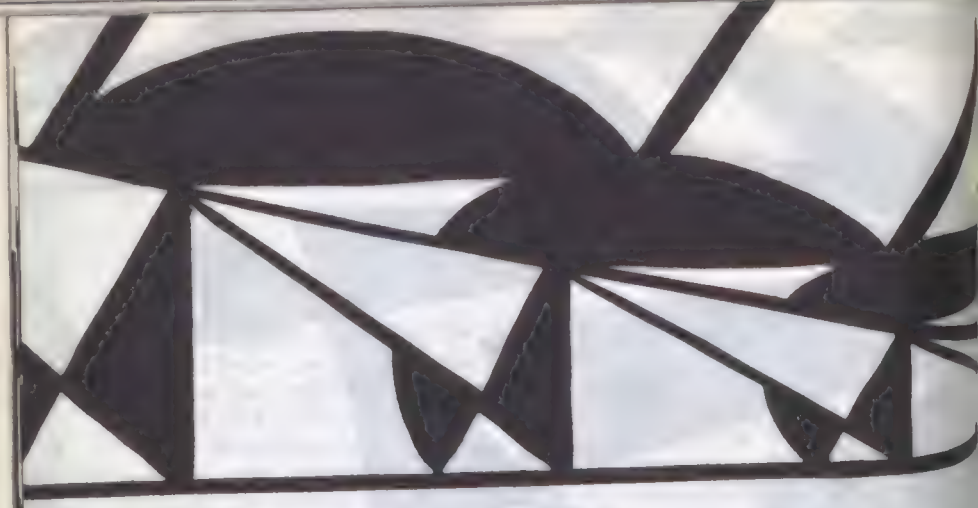
The atmosphere of the School is one of serious-minded effort toward ma
development. Being a small school, it recognizes the individual as the sing
most important element in the educational process. The student body, und
graduate and graduate, has a primary interest in design, research, developme
and management in both scientific and engineering activities. Many alumni
the School are successfully engaged in all fields of engineering—in scien
management, government, and education.

The philosophy of the School, which might be summarized as "educa
for creativity, not conformity," has through the years reflected the m
subtle and profound changes in the engineering profession.

The faculty of the School and I look forward to providing a closer a
more fruitful relationship with you. If you need additional information, ple
do not hesitate to call upon the Department Chairmen or me.

HAROLD LIEBOWITZ
Dean
School of Engineering
Applied Science

SESQUICENTENNIAL
1821 GEORGE WASHINGTON UNIVERSITY 1971



THE STUDY OF ENGINEERING

THE MEANING OF ENGINEERING AND APPLIED SCIENCE

ENGINEERING IS A BROAD PROFESSION. Its responsibilities and activities extend into every aspect of industry and research, and into many fields of commerce and the arts. Engineers have faced and continue to face problems in the production and distribution of all types of manufactured products, including the design of mechanical, electrical, and chemical processes, of equipment and of plants in which such products are made; in the design and construction of an infinite variety of structures such as bridges, tunnels, harbors, and dams; in aircraft design and construction, including complicated electronic equipment for control, guidance, and communication; in the operation of transportation systems; in the wide spectrum of activities existing in the automotive industry; in the missile and space programs; in the generation and transmission of power; in the modern phases of communication; in the control of traffic; in city planning; in public health and sanitation as it affects the environment; and in ventilation and refrigeration. This list of applications is far from exhaustive, but it does indicate, however, that engineering is a broad profession in which there are many specialists.

THE RELATIONSHIP OF ENGINEERING AND SCIENCE

In any discussion of "engineering and applied science," it is profitable to emphasize the distinction between engineering and science. The President's Scientific Advisory Committee points out that the engineer and scientist each play an important role on a team. "The scientist is one who seeks to extend the boundaries of knowledge in his chosen field. The engineer has the task of combining the knowledge of science with his knowledge and awareness of the needs and limitations of human beings and of a human society to develop and create things for human use. . . . While scientists have uncovered the basic knowledge, it is the engineers who have created the tangible tools, materials, and products that have revolutionized our daily lives, our community living, and our national defense."

The work of engineers is a focal point at which scientific knowledge, the use of such knowledge as a service to society, financial material, human resources, and society's needs are interrelated. The engineer is concerned, therefore, with the means for operating a dynamic society. He must consider not only whether the knowledge that exists will enable him to create a workable product, but also how the product can be built, who will use it, and how such use will affect the environment in which it will operate.

THE PROFESSIONAL ENGINEER

Engineers are concerned with the quality and preservation of human life. Engineer, as the term is used in this catalogue and as it is commonly understood in our society, refers to the person who makes use of the advances of science and technology in an economically feasible manner for the benefit of society. This process is complex and challenging. Although the content of engineering curricula is certainly scientific, the engineer has not lost his sense of purpose in serving as an intellectual agent in the practical world. This responsibility of the engineer arises from the breadth of the implications of engineering for the whole of society as well as from the depth of the requirements for competence. Technology has radically rearranged human life in our time. There are many who believe that, although the threshold of space has been crossed, the union of medical and engineering practice has been achieved, and breakthroughs have been made in other areas, this impact of engineering on modern life is just a modest preview of the engineering of tomorrow.

ENGINEERING EDUCATION AND THE STUDENT

Rapidly changing and advancing engineering activity requires an education for the future based on fundamental principles of science useful in applications to a dynamic, advanced society. In the fields of engineering and applied science there is no substitute for demonstrated ability and competence to solve the problems faced. Without question, achievement in particular courses of study is important. Equally important, however, is the ability to analyze and interpret all the aspects of a problem, to formulate solutions, and to evaluate those solutions in the light of all available information. The attainment of this objective is the basis for undergraduate education. The undergraduate program of the School of Engineering and Applied Science is subjected to periodic evaluation and appraisal by the faculty.

The curricula of the School of Engineering and Applied Science are founded on one basic principle—to assist the student in preparing for a career in engineering and applied science. This philosophy requires that the student master the principles on which future practice will be based and that he receive an education centered on that meaningful junction between theory and practice so that throughout his professional life he can follow the many interests and opportunities that may develop.

It should not be assumed, however, that only the intellectual elite should consider the study of engineering and applied science. Engineering, like medicine, law, education, science, history, government, and other disciplines, requires scholars. But in any of these areas, even though the prospective student has not achieved high scholastic standing, if he is genuinely interested in the subject, he can probably find a place for himself. Those who are moderately well-endowed with mental ability and who are interested and willing to

work will find in engineering and applied science a rich and varied field o
study which can lead to satisfaction and success. It is difficult to make ge
eralizations in this area, but if a student has demonstrated an aptitude fo
mathematics, science, and English, he will probably find the work of engineer
and the study of engineering and applied science satisfying and challenging
Innate intellectual curiosity and the desire to learn and to work hard are goo
indicators of success. College Board examinations may reveal the capacity t
manage further study in mathematics and science and their applications t
engineering. No school or college can "give" an education. It can offer on
the opportunity to "get" an education. The George Washington University
School of Engineering and Applied Science is a small school which provide
an opportunity for close liaison with faculty members, as well as the oppor
tunity to participate in matters of student concern—in organizations, by work
ing on the magazine, and through other student activities. The School recog
nizes the individual as the most important element in the educational process



THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE

HISTORY

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE was organized October 1, 1884, as the Corcoran Scientific School of Columbian University and was situated in the University Building then at 15th and H Streets, N.W. The School was named in honor of William W. Corcoran, Trustee and President of the Corporation from 1869 to 1888. Day and evening courses were offered in Literature, Science, and Technology and led to the degrees of Bachelor of Science, Civil Engineer, Mechanical Engineer, and Mining Engineer. The School was among the first to accept women for degree candidacy in engineering.

In 1903 the Corcoran Scientific School, the School of Graduate Studies, and the Columbian College were merged into a single Department of Arts and Sciences. Engineering degrees were made graduate.

Administrative changes led to The Washington College of Engineering being initiated in 1905 as one of the several semi-independent undergraduate colleges of the University, each with its own Board of Trustees. The College provided instruction leading to undergraduate degrees in engineering and architecture.

In 1909 the name of the College was changed to the College of Engineering and Mechanic Arts, and the curricula were revised to give the student a thorough understanding of the theory underlying engineering practice. Emphasis was placed on the development of a knowledge of scientific principles upon which the student could build and by which he might solve new problems as they are met in practice.

The name of the School was changed again in 1914 to the College of Engineering and later to the School of Engineering. Architecture was dropped from the curriculum, and degrees were limited to the field of engineering. However, the primary emphasis upon principles rather than technology which had characterized the School since 1903 was continued and has remained to this day as one of the important distinguishing features of the School.

In 1962 the name of the School became the School of Engineering and Applied Science.

ACADEMIC STATUS

The George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Secondary Schools.

The University is on the approved list of the American Association of University Women and is a member of the College Entrance Examination Board.

The curricula in Civil Engineering, Electrical Engineering, and Mechanical Engineering are accredited by the Engineers' Council for Professional Development.

Undergraduate Study

THE UNDERGRADUATE PROGRAM is intended to provide a solid foundation in the basic principles, concepts, and techniques underlying engineering and applied science, on which the individual may build technical competence in a variety of areas as his professional career develops. It is preparation for a career in engineering or applied science, as it exists today and as it may develop in the future.

Undergraduate study is the formal beginning of a life-long continuing program of education. The School provides an environment that encourages and fosters the attitudes and disciplines essential to professional growth. The graduate, when he receives his Bachelor's degree, is prepared for productive work in his chosen field; he is also prepared for further development and progress, both formal and informal. The undergraduate curricula include courses in the humanities and social sciences to the extent necessary to develop a reasonable understanding and appreciation of these areas of knowledge.

Admission to the engineering program indicates that the student possesses at least minimum preparation and the probable capacity to meet the academic demands of this School. Since the School cannot predict either the student's response to the demands made on him or the program he should follow for his most effective development, the undergraduate program has been designed to offer a variety of experiences through which the student may find his own best path to maturity and growth in educational development.

The School is a place for learning; for experiencing adventures of the mind and of the hands; for the formulation, exchange, and exploration of ideas. During his undergraduate years the student is led to strengthen his skills in analysis and his talent for creative activity, through liberal use of project-type laboratory work. Independent thought and original ideas receive higher evaluation in the appraisal of student achievements, than the rote recital of information.

ADMISSION TO UNDERGRADUATE STUDY

The School admits those applicants who can benefit themselves and society by disciplined intellectual effort in its environment.

Admission is the first selective step in a long series of qualifying steps the student will take in his progress toward professional competence in engineering, and indicates the School's belief that the applicant has at least the minimum preparation and ability to complete the curriculum successfully.

The applicant must be of good character and must have an academic background appropriate for the program of studies contemplated.

APPLICATION FOR ADMISSION

An applicant for admission obtains from the Office of Admissions of the University an application blank which he must fill out completely and return with the $25* application fee.

STUDENTS FROM U. S. INSTITUTIONS

Records presented become the property of the University and *cannot* be returned.

FRESHMAN ADMISSION

Consideration for admission is based on the following:

1. An acceptable certificate of graduation from an accredited high school showing at least fifteen units†;
2. The principal's statement that the applicant is prepared to undertake college work;
3. Scores on the following College Entrance Examination Board tests: the Scholastic Aptitude Test, the English Composition Achievement Test, and a Level I (Standard) or Level II (Intensive) Mathematics Test—Level I preferred.

The qualifications of applicants who, because of unusual circumstances, do not meet the above requirements will be considered by the School, which may prescribe admission tests.

Nine and one-half of the fifteen units required for entrance must be distributed as follows: three in English, two in algebra, one in plane geometry, one-half in plane trigonometry, one in physics or chemistry, and two in one foreign language or history. General science may *not* be counted in satisfaction of the science requirement but may be counted as an elective unit.

It is recommended that *both* physics and chemistry be studied in high school. A high school course in solid geometry is recommended as a firm foundation for college mathematics.

An applicant must arrange to have sent directly *from his school to the Office of Admissions* the academic record of his first seven terms in secondary school, together with a personal evaluation and recommendation from his principal. This information may be supplied on a form provided by the University or on a standard form used by the secondary school provided all essential information is included.

Quantitative Deficiency.—A graduate of an approved high school who lacks not more than two units of the required subjects and who presents fifteen acceptable units may be admitted to a prescribed program which includes courses to make up his deficiencies.

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* Application fee must be by check or postal money order, payable to George Washington University. The application fee is waived for a student applying for readmission who was registered in a degree program at the time of his last registration at this University and has not since registered at another institution.

† A unit represents a year's study in a secondary school subject, including in the aggregate not less than 120 sixty-minute periods of prepared classroom work.

REGULAR ADMISSION

Applicants for regular admission who wish to begin study in the fall semester should formulate plans early in the senior high school year. The University prefers to have applications submitted during the fall term of the senior high school year, although applications will be accepted up to March 1. Students graduating at midterm wishing to begin study in the spring semester must apply no later than December 1. Applications and all required credentials of students wishing to begin study in either the first or second term of the summer session must be received prior to March 1.

EARLY DECISION PLAN

For the qualified applicant who wants to begin college in the fall semester and receive an early guarantee of space, the University offers an early decision plan. The applicant need *only* indicate on the application form that he wishes an early decision and have all required credentials in the Office of Admissions of the University prior to November 1. A decision will be mailed by December 15. The declaration of intent to attend the University and a $200 tuition deposit (plus an additional $200 housing deposit for resident students), nonrefundable, *must be submitted by January 15 to reserve space.*

If the applicant is accepted under the early decision plan but fails to submit the deposit by January 15, he will be reconsidered along with all other applicants, for regular admission, as described above.

TRANSFER STUDENTS

Transfer students from other institutions *must* submit application and required credentials prior to August 15 for the fall semester, December 15 for the spring semester, May 1 for the Summer Sessions.

The transfer student must be in good standing as to scholarship and conduct. He must be eligible to return to the last previously attended institution in the semester for which he seeks admission to this University.

An applicant who has attended one or more institutions of higher learning must request *each* registrar to mail directly *to the Office of Admissions of the University* a transcript of his record, *even though credits were not earned.*

If an applicant has fewer than 30 semester hours of acceptable work (C or better on academic work from an accredited institution), he must request that his high school record and College Entrance Examination Board Test scores be sent to the Office of Admissions.

STUDENTS FROM FOREIGN INSTITUTIONS

Application, required records, and scores on the *Test of English as a Foreign Language* (see below) must be received from all *foreign applicants* no later than March 1 for the fall semester and November 1 for the spring semester.

REQUIRED RECORDS

Applicants must request all educational institutions attended to send directly to the Office of Admissions of the University official credentials listing subjects studied, grades received, examinations taken, and degrees received. Certified

copies of diplomas and certificates from secondary schools and all colleges and universities attended are required. Records of state examinations and certificates are also needed. All records become the property of the University and *cannot* be returned.

LANGUAGE TEST

Students whose native tongue is not English are required to take the *Test of English as a Foreign Language*. Students are responsible for making arrangements for taking the test and should address inquiries to: TOEFL, Educational Testing Service, Princeton, New Jersey 08540, U.S.A. The completed application form should be returned to the Testing Service at Princeton well in advance of the beginning of the semester for which the applicant seeks admission. The test fee, which should be remitted with the application, entitles the student to have his test score sent to three different institutions. Registration for the *Test of English as a Foreign Language* does not constitute application for admission to George Washington University

The Bulletin of Information, obtainable without charge, contains a description of the test as well as rules regarding application, fees, reports, and the conduct of the test; lists of examination centers; examination dates; and application blank. On the application for the test, the student should specify that the scores be sent to the Office of Admissions, George Washington University, Washington, D.C. 20006.

If additional tests are prescribed, necessary instructions will be sent to the applicant by the Office of Admissions.

READMISSION

A student previously registered in the University who was not registered on campus during the immediately preceding semester must apply for readmission. Final dates for applying are the same as those for "Transfer Students," see page 14. If the student applies for a degree program and was previously registered as a nondegree student, or if he has attended one or more higher institutions during his absence from the University, he must have complete, official transcripts sent to the Office of Admissions from each institution attended before his application will be considered. Applications for readmission are considered on the basis of regulations currently effective.

The application fee is waived for a student applying for readmission who was registered in a degree program at the time of his last registration at this University and has not registered at another institution since his last registration at this University.

TUITION DEPOSIT

Upon notification of acceptance, a $100 tuition deposit ($200 for students admitted by early decision, see page 14) will be required of all full-time students including those readmitted. The deposit is credited toward tuition and is not refundable.

ADVANCED STANDING

CREDIT FOR ADVANCED PLACEMENT EXAMINATIONS

Advanced standing may be granted for study at the collegiate level in advanced courses in an approved secondary school, if substantiated by satisfactory performance in the appropriate Advanced Placement Examination of the College Entrance Examination Board. Arrangement for the examination is the responsibility of the applicant and should be made with the College Board, Advanced Placement Examinations, Educational Testing Service, 20 Nassau Street, Princeton, N.J. 08540 or 1947 Center Street, Berkeley, Calif. 94707.

The applicant must request the examining service to submit the test papers and scores to the Office of Admissions. Consideration is given to both the quality of performance on the examination and the quality and content of the course of study completed by the applicant. Credit may be withheld pending satisfactory completion of higher-level courses in the same field.

Total credit that may be so granted is up to 30 semester hours, not more than 8 semester hours of which may be in any one examination area.

CREDIT FROM HIGHER INSTITUTIONS

Advanced standing may be granted for work successfully completed at accredited institutions of higher learning. Credit will be granted for transferred work only when it meets the requirements for the degree sought at this University and subject to the general University regulations concerning satisfactory subsequent work. Only work of passing grade (*C* or higher) will be considered for transfer.

SERVICE SCHOOL CREDIT

A limited amount of credit earned in service schools since 1941 may be considered for assignment to qualified degree candidates in the School of Engineering and Applied Science. Veterans should submit to the Office of Admissions photostatic copies of their service school records, indicating courses successfully completed with sufficient identification of the course to locate it in the *Guide to Evaluation of Educational Experience in the Armed Forces.*

REGULATIONS

Regulations regarding REGISTRATION, FEES AND FINANCES *are stated on pages 104–10; other University regulations, on pages 116–20.*

ATTENDANCE

A student may not attend classes until registration is completed and fees due are paid. He may attend only those classes for which he is registered. Regular attendance is required. A student may be dropped from any course for undue absence.

A student suspended for any reason may not attend classes during the period of suspension.

The student is expected to attend every meeting of the course in which he registered, fully prepared to carry on the work required. The student is held sponsible for all work in the course, and all absences must be excused before ovision will be made for him to make up the work missed. Excuses for abnces from examinations which have been announced in advance can be obined only by written application to the instructor in charge of the course.

CADEMIC WORK LOAD

full-time undergraduate student who is not on probation may register for no ore than 20 semester hours. A student employed more than 24 hours a week no is not on probation may take no more than 10 semester hours. In exceponal cases these limits may be exceeded with the Dean's permission.

A student previously unemployed who accepts employment after registration ust immediately report that fact to the Dean so that his schedule may be justed if necessary.

DVISORY SYSTEM

he School of Engineering and Applied Science encourages a close facultyudent relationship. Every entering undergraduate student is assigned a permant faculty adviser to assist him in orienting himself in the professional disline. Faculty advisers counsel students on their programs of study, the hievement and maintenance of satisfactory scholastic performances, professnal development, and extracurricular activity as part of the educational proc-. The adviser represents the student in all cases requiring faculty action.

Students must obtain their advisers' approval of programs of study prior to gistration. Until a student has completed the work required for the degree must consult his adviser in all academic matters. However, an adviser may t deny a student entry into any course or activity to which he is entitled der the regulations of the School.

All students are encouraged to discuss college problems with their advisers instructors at any time; and parents or guardians are invited to consult with Dean, Department Chairman, and advisers concerning any student probns.

Faculty advisers discharge their counseling duties in accordance with the gh principles of their professional responsibility; however, the final responlity for a student's action lies wholly with the student.

HOLARSHIP

r scholarship requirements for graduation, see "Graduation Requirements," ge 19.

Grades.—Grades are mailed to the student through the Office of the Regist at the close of each semester.

The following grading system is used: *A*, excellent; *B*, good; *C*, passing; *F*, ling; *CR*, credit. Whenever a grade has not been assigned, the symbol *I* ncomplete) or the symbol *W* (authorized withdrawal) is recorded.

An *I* (incomplete) grade is given by an instructor only for reasons satisfacy to the instructor and presented to him before the last day of classes for semester in which the course is given. At the option of the instructor, the de of *I* may be recorded if a student, for reasons beyond his control, is

unable to complete the work of the course, and if the instructor is informed of, and approves, such reasons before the date when grades must be reported. The grade may be used only if the student's prior performance and class attendance in the course have been satisfactory. Any failure to complete the work of a course which is not satisfactorily explained to the instructor before the date when grades must be turned in will be graded *F*. If acceptable reasons are later presented to the instructor, he may initiate an appropriate grade change. Although the grade of *I may* remain on the records for a maximum of one year, the instructor should normally set a much briefer period within which the uncompleted work (usually the final examination or required paper) must be made up. The grade of *I* cannot be removed by reregistering for the course here, or by taking its equivalent elsewhere. An *I* cannot be made up after the lapse of one calendar year except by written permission of the Dean's Council.

Mid-semester Warning.—At the end of the seventh week of each semester, instructors report to the Dean the names of students whose scholarship is unsatisfactory. On receipt of a warning notice the student must consult his instructor and his adviser immediately.

The adviser may prescribe diagnostic tests and/or remedial study to be completed before the end of the current semester.

Probation.—A student who receives two grades or more of *F* in one semester will be placed on probation. This probation extends over the period in which the student completes a minimum of 12 semester hours of study and may be extended over a longer period. If a student earns a grade of *C* or better in all courses taken during the period of probation, he is removed from probational status. If he receives one grade of *F* while on probation, the probationary period is extended for a semester.

Upon being placed on probation, a student may elect to undertake the Engineering Student Probation Program of testing, counseling, and remedial work available at the Counseling Center. If this program is undertaken, the student is continued on probation until his scholastic deficiency is removed. However, students may be continued on probation in this program no longer than four semesters. At the end of this period, each student's case is reviewed in accordance with the general rules concerning probation and suspension.

A student on probation is required to follow a specified program of study, including remedial studies as prescribed, and is not eligible to participate in student activities.

Suspension.—If a student receives one or more grades of *F* in a second semester of probation, he will be suspended, unless he is participating in the Engineering Student Probation Program.

A student suspended for poor scholarship may apply to be readmitted in the semester or summer session which begins next after an interval of one calendar year. A student readmitted after suspension is on probation. In no case will the probationary period after readmission exceed 24 hours of study. A student suspended twice for poor scholarship will not be readmitted.

HONORS LIST

The Faculty of the School recognizes meritorious scholastic achievement by an Honors List, containing the names of candidates for undergraduate degrees whose scholastic achievement satisfies all of the following requirements:

1. The completion of a minimum of 13 semester hours in one semester, with the total number of hours in which the grade of *A* is earned being at least equal to the total in which the grade of *C* is earned.
2. No grade below *C* has been received during the qualifying period.
3. No disciplinary action has been taken in respect to the student.

The Honors List is prepared at the end of the fall and spring semesters and displayed in an appropriate public place in the School. A notation is made on the student's record each time his name is included in the List.

USE OF CORRECT ENGLISH

Any student whose written or spoken English in any course is unsatisfactory may be reported by the instructor to the Dean. The Dean may assign supplementary work, without academic credit, varying in amount with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition fee is charged. The granting of a degree may be delayed for failure to make up any such deficiency in English to the satisfaction of the Dean.

GRADUATION REQUIREMENTS

See page 118 for general requirements for graduation.

RESIDENCE

A minimum of 30 weeks and 30 semester hours must be completed in residence. Summer work may be counted. Unless special permission is granted by the Dean to study elsewhere, the work of the final year must be completed in residence.

QUALITY-POINT INDEX

The quality-point index, which is computed to determine scholastic eligibility for graduation (see below), is obtained by dividing the number of quality points by the number of semester hours for which the student has registered.

Quality points are computed from grades as follows: *A*, four points; *B*, three points; *C*, two points; *F*, no points, for each semester hour for which the student has registered. Courses marked *W*, *I*, or *CR* are not considered in determining the index, except that courses marked *I* will be considered when a formal grade is recorded. Grades in courses taken at another institution are not considered in computing the quality-point index.

SCHOLARSHIP

To be eligible for graduation a student must have a quality-point index of at least 2.2 in those technical courses specified in the fifth through the eighth semester of his curriculum.

HONORS

With Distinction.—A Bachelor's degree may be conferred "With Distinction," at the discretion of the Faculty, if a student attains a quality-point index of 3.50 or higher on all work taken at this institution. To be eligible for this

honor a student must have completed at this institution at least one-half of the work required for the degree.

Special Honors.—A Bachelor's degree may be conferred with "Special Honors," at the discretion of the Faculty, for outstanding achievement in the student's senior year work on recommendation of the Faculty, under the following regulations:

1. The student must have his candidacy for Special Honors approved by the department chairman representing his major field not later than the beginning of his senior year.
2. The student must meet such other conditions as may be set at the time his candidacy is approved.
3. No student will be awarded Special Honors unless he has a quality-point index of at least 3.00 on all work taken at this institution.
4. To be eligible for Special Honors a student must have completed at this institution at least one-half of the work required for the degree.

UNDERGRADUATE CURRICULA

The four four-year curricula lead to the degree of Bachelor of Science, with parenthetic designation of the major; for example, Bachelor of Science (Electrical Engineering). Students who are deficient in preparation require a longer period; those who are admitted with advanced standing or who attend summer sessions can complete the requirements in less time.

The program of the first four semesters (2 years) is common to all curricula and provides the essential broad base of scientific principles and mathematical techniques necessary for the professional courses of the last four semesters, together with an appropriate background in the humanities and social sciences (see below).

A minimum total of 130 semester hours is required to qualify for the degree. However, students are encouraged to elect additional course work above the required minimum to the extent that their interests and the School's offerings permit.

Degrees are offered in Civil Engineering, Electrical Engineering, Measurement Science, and Mechanical Engineering. Students in Electrical Engineering may select an area of concentration in Computer Science.

The student is assisted by his faculty adviser, who approves his program each semester prior to registration. For the guidance of the student and his adviser, every beginning student takes the School's placement examinations in English, reading, algebra, and trigonometry and, if deficient in any of these areas, must take remedial work in the area of deficiency.

COURSES IN THE HUMANITIES AND SOCIAL SCIENCES

The basic purpose of a program in the humanities and social sciences for engineering students is to assist the student in acquiring knowledge which will permit him to understand the social and humanistic elements of the past and present and to analyze the problems facing his society today. The ultimate goal is to help the engineer have a better understanding of his society and an appreciation of his role and responsibilities within it.

Since the education of an engineering student is, by necessity, oriented toward technical subjects, his program in the humanities and social sciences

should not emphasize technical aspects and skills, but should rather consist of courses which can broaden his outlook and motivation toward sociological and humanistic sensitivities. As a consequence, courses in subjects such as accounting, finance, industrial management, introductory languages, and personnel administration should not be included in the humanities and social sciences program. On the other hand, courses in areas such as anthropology, economics, fine arts, geography, history, literature, philosophy, political science, psychology, and sociology are considered appropriate.

Each engineering student is required to prepare, with the assistance of his faculty adviser, a program of courses in the humanities and social sciences, explaining how his program meets the purpose stated above. The student's program must include a minimum of 18 semester hours and must be approved by both his adviser and department chairman.

Graduate Study

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE offers graduate study leading to the degrees of Master of Science, Master of Engineering Administration, and Doctor of Science.

In its graduate programs, the School, as it does in undergraduate study, adheres to the educational philosophy of increasing the knowledge and understanding of the individual student by concentration on principles and their application rather than by encyclopedic coverage of techniques and specialized detail. Each program is individually planned according to the student's preparation and needs.

Graduate study may be undertaken in any field of engineering or applied science in which the School has adequate facilities and resources. Upon approval, the student may select courses in other departments of instruction in the University in order to serve specific needs or objectives.

Fields and areas of concentration offered by the Department of Civil, Mechanical, and Environmental Engineering (see pages 43–48), the Department of Electrical Engineering and Computer Science (see pages 71–72), and the Center for Measurement Science (see page 94) lead to the degree of Master of Science or Doctor of Science. In the Department of Engineering Administration and Operations Research, the field of Engineering Administration leads to the degree of Master of Engineering Administration or Doctor of Science, the field of Operations Research leads to the degree of Master of Science or Doctor of Science, and the field of Systems Analysis leads to the degree of Master of Science.

THE MASTER'S PROGRAMS

The student's program may provide for broad coverage in a variety of fields or may be designed to provide a concentration in particular areas. The minimum program consists of 24 semester hours of approved graduate courses and a Master's thesis (equivalent to 6 semester hours). With the approval of the

Department, the student may elect an optional program without a thesis which consists of a minimum of 33 semester hours of approved graduate courses. All Master's candidates are required to pass a Master's Comprehensive Examination. Students whose undergraduate study does not include necessary prerequisites may be required to take more than the minimum semester hours required.

Upon admission the student is assigned an adviser. Programs of study are determined by any prerequisites established and the requirements of the department in which the student wishes to study. The program of studies in preparation for the Master's Comprehensive Examination must be approved by the student's adviser and the appropriate department chairman.

ADMISSION

Admission to graduate study toward a Master's degree requires an appropriate Bachelor's degree from a recognized institution and evidence of capacity for productive work in the field selected, as indicated by undergraduate grades, Graduate Record Examination scores, and similar data.

An applicant who has significant deficiencies in preparation may be required to take prescribed undergraduate courses as an unclassified student before being admitted to graduate student status. In some cases, if such deficiencies are minimal, he may be admitted to graduate student status and allowed to take a limited number of graduate courses while completing the undergraduate courses in which he is deficient. In no case may the undergraduate courses thus taken fulfill any part of the requirements for the Master's degree.

For additional admissions requirements for the degree of Master of Engineering Administration, see page 85, for the degree of Master of Science in the field of Operations Research, see page 86. Candidates for the degree of Master of Science in the Department of Electrical Engineering and Computer Science must have satisfied specific undergraduate requirements, depending upon the area of concentration. Students should consult the special brochure *The Graduate Programs of the Department of Electrical Engineering and Computer Science*.

ADMISSION PROCEDURE

Forms for application for admission are available at the School of Engineering and Applied Science. They must be submitted, together with the application fee of $25, to the Director of Engineering Admissions, Room 100, Tompkins Hall of Engineering, George Washington University, Washington, D.C. 20006, no later than September 1 for the fall semester, December 15 for the spring semester, May 1 for the first summer session, and June 1 for the second summer session. The applicant must request each educational institution attended since high school graduation to send an official transcript of his record directly to the Director of Engineering Admissions. If the applicant has completed the Graduate Record Examination, he should request that his scores be sent to the School. The applicant will be notified by mail when a decision on his admission has been made. Foreign students are required to take the *Test of English as a Foreign Language* (see page 15).

All inquiries and correspondence relative to graduate admission should be directed to the Director of Engineering Admissions.

TRANSFER CREDIT

Up to 6 semester hours of satisfactory credit (with grades of *A* or *B*), which normally must have been earned in a graduate program at another recognized institution, *may* be accepted in transfer, when applicable, to satisfy Master's degree requirements in this School. However, the student must, with the approval of his adviser, petition to the appropriate department chairman for such a transfer.

REGISTRATION

A graduate student may register for classes when he presents an official letter of admission or his student identification card from the previous semester. No registration is accepted for less than a semester or one summer session.

Concurrent registration in this School and in another institution not a member of the Consortium of Universities of the Washington Metropolitan Area, Inc., or another division of this University requires the written permission of the Deans concerned, *prior to registration*. Allowance of credit for work done concurrently at another institution is at the discretion of the Dean.

Dates and hours of registration are stated in the Calendar, page 4, and in the *Schedule of Classes* published in advance of each semester.

MASTER'S THESIS

The degree candidate must submit an acceptable thesis to demonstrate his ability to make independent use of the knowledge and discipline of thought acquired and developed by graduate study, to furnish objective evidence of constructive power in a given field, and to demonstrate that he can communicate the results of his work in writing. Work of a suitable character for which the student has professional responsibility may be considered, whether done on or off campus, provided no significant amount of work is completed without faculty supervision.

As a part of registration for the thesis course 299, the candidate must submit to the appropriate department chairman (on the form obtainable at the School office) his thesis area, approved by his faculty adviser. He must submit his thesis title to the Dean, on the form available in the School office, at the beginning of the semester in which he expects to graduate. Registration in thesis 299–300 entitles the student, during such registration, to the advice of the member of the faculty under whom the thesis is to be written. He may consult his adviser, but the thesis is the exclusive responsibility of the student.

The thesis in final form must be submitted to the appropriate department chairman by the date stated in the calendar for the semester in which the candidate enrolls in thesis 300. In case a thesis is unfinished on the date specified, the student will be granted an additional semester and must pay the "Continuous Registration" fee (see page 107) unless he is registered for course work. If the preparation of the thesis extends beyond the three semesters, approval for an extension of time will be required and the student must reregister for thesis 300 and pay tuition as for a repeated course. The overall time limit for earning the degree (see page 25) may not be exceeded.

A thesis may be submitted in final form one time. The acceptability of the thesis is determined exclusively by the Master's Comprehensive Examination

committee. If the thesis is unacceptable, the student's graduate status is terminated.

Printed copies of detailed regulations regarding the form and reproduction of the thesis are available in the Office of the School. Accepted theses, with accompanying drawings, become the property of the University and are deposited in the University Library, where the duplicate copies are bound and made available for circulation. Permission to publish or adapt material in them must be secured from the Dean.

MASTER'S THESIS OPTION

With the approval of the Department, the student may elect an optional program without a thesis which consists of a minimum of 33 semester hours of approved graduate courses.

MASTER'S COMPREHENSIVE EXAMINATION

After completing his prescribed program, the candidate must pass a Master's Comprehensive Examination, to demonstrate substantial understanding of principles and method and their use in the area of his interest. This Examination may be written, oral, or both. A graduate student who fails any portion of the Master's Comprehensive Examination on his first attempt may be examined one more time if approval is given by the appropriate Examining Committee. In the event of failure to complete the Examination satisfactorily, the student's graduate status terminates.

REGULATIONS

Regulations regarding REGISTRATION, FEES AND FINANCES *are stated on pages 104–10; other University regulations, on pages 116–20.*

ATTENDANCE

A student may not attend classes until registration is completed and fees due are paid. He may attend only those classes for which he is registered. A student is expected to attend every meeting of the course in which he is registered, fully prepared to carry on the work required. A student may be dropped from any course for undue absence. Excused absences must be arranged with the instructor.

SCHOLARSHIP

Grades are indicated as *A*, excellent; *B*, good; *C*, minimum pass; *F*, fail; and *CR*, credit for satisfactory thesis completion. Whenever a grade is not assigned, the symbol *I* (incomplete) or the symbol *W* (authorized withdrawal) is recorded.

At the option of the instructor, the grade of *I* may be recorded if a student, for reasons beyond his control, is unable to complete the work of the course, and if the instructor is informed of, and approves, such reasons before the date when grades must be reported. The grade may be used only if the student's prior performance and class attendance in the course have been satisfactory. Any failure to complete the work of a course which is not satisfac-

torily explained to the instructor before the date when grades must be turned in will be graded *F*. If acceptable reasons are later presented to the instructor, he may initiate an appropriate grade change. Although the grade of *I* may remain on the records for a maximum of one year, the instructor should normally set a much briefer period within which the uncompleted work must be made up. The grade of *I* cannot be removed by reregistering for the course here, or by taking its equivalent elsewhere. An incomplete which is not removed within one calendar year is automatically changed to an *F*.

A student may not repeat for credit a course in which he has received a grade of *C* or above, unless required to do so by the department concerned. A written statement requiring the student to repeat such a course for credit must be submitted to the Registrar by the appropriate department chairman.

For Master's work, a minimum of 24 semester hours (for those who receive credit for a thesis) or 33 semester hours (for those who do not receive credit for a thesis) of graduate course work with the grade of *B* or higher is required for graduation. Students who receive two grades of *F*, or (except those registered prior to and in continuous residence since the 1967 fall semester) three grades below *B*, are barred from further enrollment in graduate courses and, ordinarily, will not be readmitted to graduate study. Students who receive the grade of *C* in one or two courses are required to take additional course work to make up the minimum semester hours of work with grades of *B* (except those registered prior to and in continuous residence since the 1967 fall semester).

RESIDENCE

In general, a minimum of one year of full-time study, or the equivalent in part-time study, must be completed in the School.

TIME TO COMPLETE MASTER'S DEGREE REQUIREMENTS

A full-time student in the Master's program is allowed a maximum of three calendar years to complete all degree requirements, from the date of his first graduate-student status registration in prerequisite or graduate courses. A part-time student in the Master's program is allowed a maximum of five calendar years. The time limit does not include any period of registration as an unclassified student before admission to graduate student status, nor does it encompass any specified period spent on approved leave of absence. Readmission is required upon expiration of leave of absence under the conditions and requirements then prevailing.

Students who do not complete degree requirements within the allowed time have their graduate status terminated. They may be readmitted to graduate status under conditions specified by the department chairman and approved by the Dean.

DOCTORAL PROGRAMS

The School of Engineering and Applied Science offers a program of advanced study and research leading to the degree of Doctor of Science. This program

is limited to recognized fields in engineering or applied science in which a scientific discipline exists and for which the University has adequate resources.

The Doctoral discipline is designed to prepare the student for a career of creative scholarship by providing a broad background of knowledge and an understanding of research methods. It requires study of interrelated fields of learning as well as original research in the field of central interest.

The discipline for the degree is divided into two stages. The first—made up of a study of interrelated fields of learning which support the general area of research concentration—culminates in the qualifying examination. The second —composed of research investigation of a particular subject in a special field and the presentation of such research findings in a written dissertation—culminates in the final examination.

ADMISSION TO DOCTORAL STUDY

The applicant must have adequate preparation for advanced study, including a satisfactory Master's degree, or the equivalent, together with acceptable personal qualities and a capacity for creative scholarship. He must have capabilities and interests beyond the mere assimilation of organized materials in formal courses of instruction. Originality of mind combined with balanced judgment and accuracy in observation or experiment are necessary to the successful applicant.

APPLICATION FOR ADMISSION

Well in advance of the opening of the semester for which the student seeks admission, he should correspond with and preferably have a personal interview with the Dean or department chairman of his proposed field of study, to discuss the University's facilities for guidance in this field, the applicant's qualifications, and the possibilities of an effective doctoral program. If an application for admission is indicated, the student will be advised concerning the details of application procedure.

LANGUAGE REQUIREMENTS

A reading knowledge is required of two foreign languages important in the student's field of interest. One language examination must be passed at the time of beginning doctoral study. The second must be passed before admission to the qualifying examination and within one year of the start of study for the qualifying examination.

STUDY FOR QUALIFYING EXAMINATION

Upon admission to study for the qualifying examination the student is assigned a faculty adviser, who directs his studies. The adviser designates fields of learning to insure the student's breadth of knowledge and support research in his central field, advises him concerning the scope and content of these fields of study, and guides him in preparation for his examination. A minimum of 30 semester hours of formal study beyond the Master's work is required prior to the qualifying examination. This requirement does not include any deficiencies to be made up or language courses taken to meet the language requirement.

The purpose of the qualifying examination is to ascertain that the student's breadth of background and intellectual development are adequate to support doctoral research and investigation in his central field. The qualifying examination may be both written and oral and usually extends over a period of six days. It is given by a special committee consisting of members of the Faculty and other specialists. Upon favorable report of the examiners to the Dean through the appropriate department chairman, the student is admitted to candidacy for the degree, to pursue his specialized study and research under the supervision of a designated member of the Faculty.

The examination is the sole test of the student's ability to qualify for admission as a candidate for the degree, and to enter the second stage of his doctoral discipline.

RESEARCH, DISSERTATION, FINAL EXAMINATION

The student admitted to candidacy for the degree requests as Director of Research the member of the Faculty under whom he wishes to conduct his research. The Faculty member may accept or reject such request. The research area is approved by the Director and the appropriate department chairman or the Dean. Throughout the remainder of the doctoral program, the candidate is responsible solely to his Director, in his research and in the presentation of his dissertation. Work on the dissertation is equivalent to a minimum of 24 semester hours.

THE DISSERTATION

A dissertation is required as evidence of ability to perform scholarly research and to interpret and present its results.

The candidate must submit to the appropriate department four complete copies of the dissertation and two original copies of an abstract (not to exceed 600 words) of his dissertation no later than the date specified in the calendar. One copy of the abstract is for inclusion in the announcement of the examination and one for reproduction by University Microfilms, Inc. One copy of the dissertation is also sent to University Microfilms, Inc.

Printed copies of detailed regulations regarding the form and reproduction of the dissertation, preparation of the abstract, and services offered by University Microfilms, Inc., are available at the School Office. The successful candidate for the doctorate is required, before receiving his degree, to pay a fee to cover the expense of printing the abstract of his dissertation, and for the basic service rendered by University Microfilms, Inc. Accepted dissertations, with accompanying drawings, become the property of the University and are deposited in the University Library, where copies are bound and made available for circulation. Permission to publish or adapt material in them must be secured from the Dean.

THE FINAL EXAMINATION

Upon approval of the dissertation by the Director, the candidate is presented for his final examination.

The final examination is oral and is open to the public. The candidate must demonstrate a mastery of his special field of interest and of the materials and

techniques used in the research. The committee of examiners includes members of the Faculty competent in the research field or in closely related subjects and may also include qualified experts brought to the University especially to participate in the examination. When the candidate satisfies the examining committee concerning the high quality and originality of his contribution to knowledge as well as his mastery of the scholarship and research techniques of his field, the committee of examiners recommends him for the degree of Doctor of Science.

RESIDENCE AND CONTINUOUS STUDY

All of the work for the degree must be done in residence (on the campus) except when special permission is granted to conduct research in an approved off-campus facility. The student must maintain "continuous registration" in the School, even when granted a leave of absence. Failure to do so breaks the student's registration, and he must apply for readmission to doctoral study under whatever new conditions and regulations are set up by the department chairman and approved by the Dean.

There is no formal regulation concerning the minimum amount of time to be spent in preparation for the qualifying examination or as a candidate engaged in doctoral research. However, the qualifying examination must be completed within five years of the date of admission, and the entire degree program must be completed within seven years. After admission the student may apply for his qualifying examination whenever his adviser believes that he is prepared to take it: his research and specialized study may be undertaken with whatever concentration of time meets the approval of his Director of Research. Normally a minimum of two years of full-time study and research is spent in meeting the requirements for the degree.



PROGRAMS OF STUDY AND COURSES OF INSTRUCTION

ON THE FOLLOWING PAGES are listed programs of study, curricula, and courses of instruction offered by the School of Engineering and Applied Science.

Students who are not candidates for degrees but who wish to take courses offered by the School should apply for admission to the Division of University Students.

EXPLANATION OF COURSE NUMBERS

Courses numbered from 1 through 199 are planned for undergraduate credit, although certain courses may be taken for graduate credit when arrangements are approved in advance by the instructor and the Dean. Courses numbered 201 to 300 are planned for graduate credit and may in certain instances be taken by qualified undergraduate students. Courses numbered from 301 to 400 are primarily for doctoral students.

SEMESTER HOURS OF CREDIT

The number of semester hours credit given for the satisfactory completion of a course is indicated in parentheses after the name of the course. Thus, a year course giving three hours of credit each semester is marked (3–3), and a semester course giving three hours credit is marked (3). A semester hour consists of the completion of one fifty-minute period of class work or of one laboratory period a week for one semester.

TIME OF COURSE OFFERINGS

Following course descriptions is a parenthetical statement listing the semester for which the course is scheduled to be offered. The term "academic year" is used only with two-semester courses, and indicates that the first half of the course is to be offered in the fall semester and the second half in the spring semester; the term "as arranged" is used for courses which could not be scheduled at the time of printing this catalogue. Offerings for the summer sessions are not designated in this catalogue. Students should consult the *Summer Sessions Catalogue* or *Schedule of Classes* for summer offerings. A *Schedule of Classes* is also published for each fall and spring semester which provides more exact and up-to-date information concerning the time of course offerings.

KEY TO ABBREVIATIONS

The following abbreviations are used in this catalogue for course designation and by students in registering for courses.

Acct	Accounting	**Math**	Mathematics
Ap S	Applied Science	**MeaS**	Measurement Science
Chem	Chemistry	**ME**	Mechanical Engineering
CE	Civil Engineering	**Phys**	Physics
EE	Electrical Engineering	**P Sc**	Political Science
E Ad	Engineering Administration	**Psyc**	Psychology
EM	Engineering Mechanics	**Stat**	Statistics
Engl	English	**U&RP**	Urban and Regional Planning
Geol	Geology		

Applied Science

Interdepartmental offerings.

UNDERGRADUATE COURSES

1–2 Engineering in Modern Society (1–1)

The role of engineering in a technological society, conventional vs. modern engineering, engineering as a profession, problem-solving approaches and engineering methods. (Offered every year: academic year—day 1972–73 and alternate years: academic year—evening)

59 Introductory Analytical Mechanics (4)

Kinematics, statics, and dynamics of a particle, statics and dynamics of systems of particles, kinematics of a rigid body, geometrical and inertial parameters of rigid bodies, statics and dynamics of rigid bodies and beams. Introduction to Lagrangian-Hamiltonian formulation. Prerequisite: Phys 31. Prerequisite or concurrent registration: Ap S 113. (Spring)

113 Engineering Analysis I (3)

Analytical methods appropriate to the solution of engineering problems. Mathematical topics include ordinary differential equations, vector calculus, and integral theorems; matrices and linear algebra; complex algebra. Prerequisite: Math 32. (Spring)

114 Engineering Analysis II (3)

Analytical methods appropriate to the solution of engineering problems. Mathematical topics include Bessel functions, Legendre polynomials, Fourier series and integrals, Laplace transform, introduction to partial differential equations and boundary value problems. Prerequisite: Ap S 113. (Fall)

GRADUATE COURSES

211 Mathematical Methods in Applied Science I (3)

Functions of complex variables and integral transforms: analytic functions theory including contour integration and conformal mapping; elements of

Fourier and Laplace transforms, special functions, Mellin and Hankel transforms, saddle point methods. Prerequisite: approval of Department. (Fall and spring)

212 Mathematical Methods in Applied Science II (3)

Introduction to the theory of linear spaces and tensors: linear vector spaces, linear transformation and matrix representation, eigenvalues, eigenvectors, Hamilton-Cayley and matrix polynomial representation theorems; Euclidean and unitary vector spaces, polar decomposition, linear and bilinear forms; elements of Hilbert spaces and generalized Fourier series; tensors, algebra of tensor components, covariant differentiation, Riemann-Christoffel tensor, curvilinear coordinates. Prerequisite: approval of Department. (Fall)

213 Mathematical Methods in Applied Science III (3)

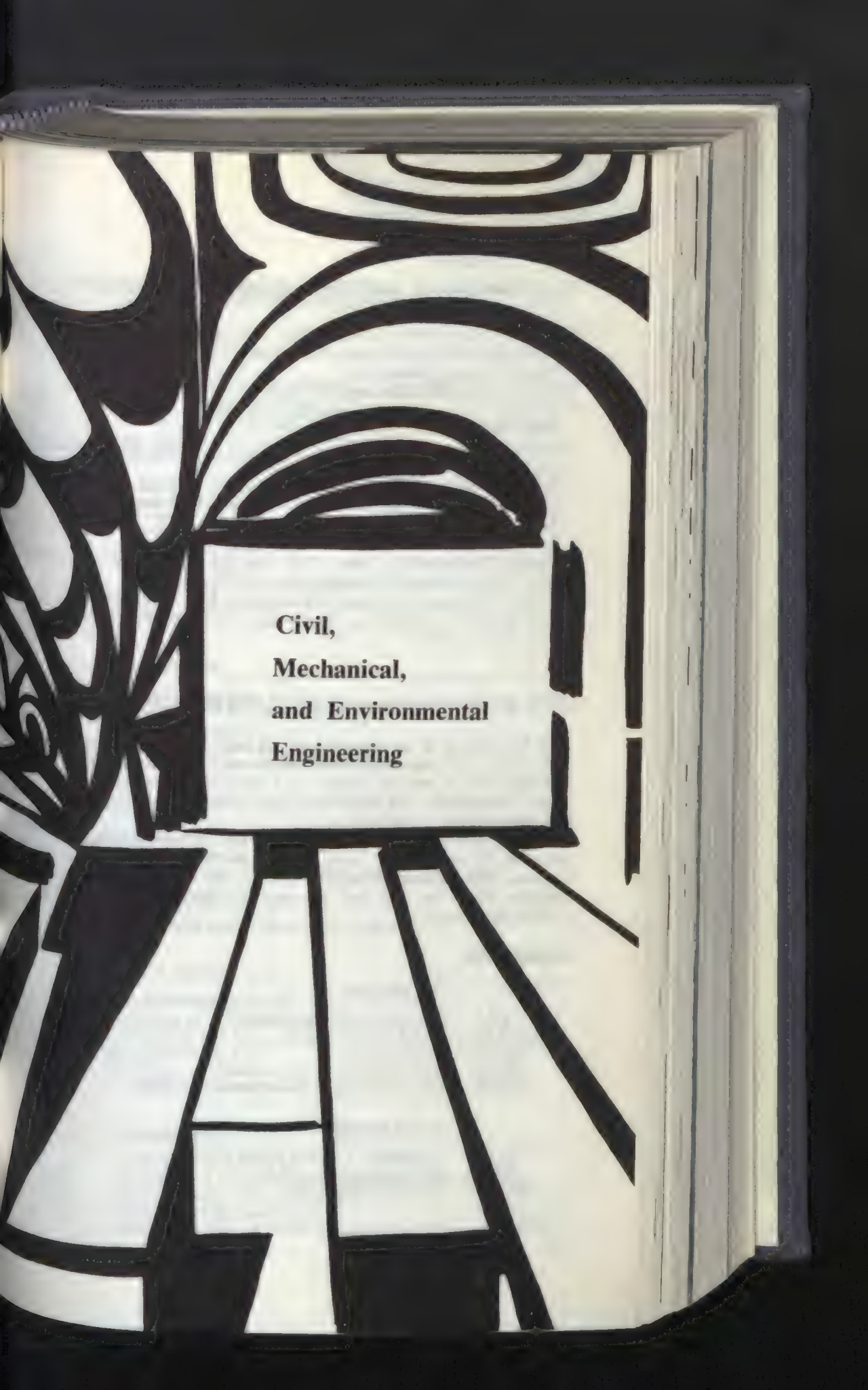
Partial differential equations and boundary value problems: first-order and linear second-order equations; solutions of the wave, Hemholtz, Laplace, Poisson, and diffusion equations and associated boundary value problems using separation of variables, integral transform, and Green's function methods. Prerequisite: Ap S 211 (which may be taken concurrently) or permission of instructor. (Fall and spring)

214 Mathematical Methods in Applied Science IV (3)

Variational methods and linear integral equations: Lagrange multiplier methods and Euler-Lagrange equation for various types of functionals, isoperimetric and constrained variational problems; Sturm-Liouville, Laplace, Poisson, biharmonic, and Hemholtz boundary and eigenvalue problems as variational problems; Ritz-Galerkin methods for approximate solutions; initial and boundary value problems as integral equations, Green's functions, Fredholm and Hilbert-Schmidt theory. Prerequisite: approval of Department. (Spring)

215 Mathematical Methods in Applied Science V (3)

Perturbation methods in engineering: nonlinear ordinary differential equations, topological and classical methods of solution, asymptotic series, boundary layer solutions; nonlinear partial differential equations, boundary layer solutions which include singular initial value and boundary value problems. Prerequisite: approval of Department. (Spring)


Civil,
Mechanical,
and Environmental
Engineering

Civil, Mechanical, and Environmental Engineering*

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Associate Professorial Lecturers M.P. Gaus, W.D. Erickson, R.W. Fralich, E.T. Kruszewski, Walter Olstad, M.J. Queijo, J.P. Raney, L.D. Staton, E.C. Yates, Jr., Shou-Ling Wang, Michael Yachnis, F.Y. Yokel, R.N. Gold, Robert Perry, M.E. Lunchick, Nils Salvesen
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Assistant Professorial Lecturers F.J. Hughes, R.W. Barnwell, J.D. Buckley, A.R. Saunders, L.H. Blakey, J.A. Gorman, Arthur Sosslau, Benjamin Whang
Lecturer S.H. Sandler

CIVIL ENGINEERING—UNDERGRADUATE STUDY

Civil Engineering is the broad branch of engineering most closely related to daily human activities. Study in this area prepares for careers in the design of buildings, bridges, tunnels, harbors, and dams; the planning of urban and regional environment; and research on new types of structures, new materials, and new methods of construction.

The concentration of study outlined in the curriculum below provides the essentials for beginning a career upon graduation, for registration as a professional civil engineer as required by law, and for continuing study at the graduate level. The first four semesters are common to all undergraduate fields in the School.

CURRICULUM

First Semester

Ap S 1:	Engineering in Modern Society (1)
Engl 1 or 1x:	English Composition (3)
Math 30:	Precalculus (3)
Phys 1:	General Physics (4)
Elective:	Selected from humanities or social sciences (3)

Second Semester

Ap S 2:	Engineering in Modern Society (1)
EE 51:	Applications of Computers (3)
Math 31:	Calculus of One Variable (3)

* Staff of instruction for the academic year 1970–71.

Phys 2: Introduction to Modern Physics (4)
Elective: Selected from humanities or social sciences (3)

Third Semester

Chem 13: General Chemistry (4)
E Ad 115: Probabilistic and Statistical Methods in Engineering (3)
Math 32: Calculus of Several Variables (3)
Phys 31: Introduction to Theoretical Physics (2)
Phys 51: Introduction to Experimental Physics (2)
Elective: Selected from humanities or social sciences (3)

Fourth Semester

Ap S 59: Introductory Analytical Mechanics (4)
Ap S 113: Engineering Analysis I (3)
CE 140: Materials Science (3)
Phys 32: Introduction to Theoretical Physics (2)
Phys 52: Introduction to Experimental Physics (2)
Elective: Selected from humanities or social sciences (3)

Fifth Semester

Ap S 114: Engineering Analysis II (3)
CE 120: Introduction to the Mechanics of Solids (4)
CE 121: Structural Theory (3)
ME 131: Thermodynamics (3)
Elective: Selected from humanities or social sciences (3)

Sixth Semester

CE 122: Structural Theory (3)
CE 183: Urban Planning (3)
CE 190: Legal and Economic Aspects of Engineering (2)
ME 126: Fluid Mechanics (3)
Geol 136: Engineering Geology (3)
Elective: Selected from humanities or social sciences (3)

Seventh Semester

CE 166: Materials Engineering (2)
CE 167: Mechanics of Materials Laboratory (1)
CE 168: Introductory Soil Mechanics (3)
CE 191: Metal Structures (3)
CE 193: Hydraulics and Hydrology (3)
Elective: Technical electives (6)

Eighth Semester

CE 182: Foundation Engineering (2)
CE 185: Soil Mechanics and Foundation Engineering Laboratory (1)
CE 192: Reinforced Concrete Structures (3)
CE 194: Environmental Engineering (3)
Elective: Technical Electives (8)

*Technical Electives**

CE 186:	Advanced Mechanics of Solids (3)
CE 195:	Urban Transportation Engineering (3)
CE 196:	Structural Safety and Reliability (3)
CE 197:	Waste and Pollution Control (3)
CE 201:	Design of Metal Structures (3)
CE 202:	Design of Reinforced Concrete Structures (3)
CE 203:	Prestressed Concrete Structures (3)
CE 208:	Rock Mechanics (3)
CE 210:	Methods of Structural Analysis (3)
CE 213:	Structural Design for Dynamic Loads (3)
CE 215:	Urban Construction Technology (3)
EM 234:	Composite Materials (3)
Geol 125:	Marine Geology (3)
Geol 128:	Geomorphology (3)
Geol 181–82:	Oceanography I, II (3, 3)
Geol 188:	Geophysics for Geologists II (3)
ME 120:	Methods of Engineering Experimentation (2)
ME 134:	Dynamics of Linear Systems (3)
P Sc 103:	State and Local Governments (3)
U&RP 201:	Introduction to Urban Planning (3)
U&RP 207:	Land Development Planning (3)
U&RP 208:	Urban Transportation Planning (3)

COURSES

120 Introduction to the Mechanics of Solids (4)

Concepts of stress and strain; strain energy; stress and deformation in slender members due to axial, torsional, and bending loads; introduction to yield criteria and inelastic deformation. Prerequisite: Ap S 59. (Fall)

121–22 Structural Theory (3–3)

Theory of determinate and indeterminate structures using both classical and modern approaches. Prerequisite: CE 120. (Academic year)

140 Materials Science (3)

Electron structure of atoms; atomic and molecular bonding; energy bands; crystal structure; imperfections; noncrystalline solids; reaction rates; diffusion; transport phenomena—thermal conductivity, electrical conduction; semiconductors; magnetism; elasticity and anelastic phenomena; microplasticity; plastic deformation; fracture. Prerequisite or concurrent registration: Ap S 113, Phys 32. (Spring)

166 Materials Engineering (2)

Mechanical properties and their description; effect of microstructure on the mechanical behavior of metals, ceramics, polymers, and polyphase materials; effect of strain-rate and temperature; creep, fatigue, and fracture; effect of surface and environment; materials evaluation for structural performance. Prerequisite: CE 120, 140; or approval of Department. (Fall)

* P Sc 103 is prerequisite to all Urban and Regional Planning courses. For Geology, Political Science, and Urban and Regional Planning course descriptions, see the *Undergraduate and Graduate Catalogue*.

167 **Mechanics of Materials Laboratory** (1)
(Formerly Materials Engineering Laboratory)

Measurement of strains and forces; determination of elastic, anelastic, and rubber-elastic parameters; observation of microplastic and plastic deformation; plastic instability; creep, creep-instability, and creep-fracture; brittle fracture; fatigue; cyclic state. Prerequisite or concurrent registration: CE 166. (Fall)

168 **Introductory Soil Mechanics** (3)
(Formerly Soil Mechanics)

Analysis of lateral earth pressures, bearing capacity, foundations, and slope stability, plus design problems involving the engineering properties of soils. Prerequisite: CE 120, ME 126. (Fall)

182 **Foundation Engineering** (2)

Subsurface exploration, design of shallow foundations, design of pile foundations, earth-retaining structures. Prerequisite: CE 168. (Spring)

183 **Urban Planning** (3)

Engineering aspects of urban planning, including transportation, water supply and sewerage, public utilities, safety and convenience, and natural environment. (Spring)

185 **Soil Mechanics and Foundation Engineering Laboratory** (1)
(Formerly Soil Engineering Laboratory)

Laboratory experiments for the classification, strength, compressibility, and general engineering properties of soils. Prerequisite or concurrent registration: CE 182. (Spring)

186 **Advanced Mechanics of Solids** (3)

Deformation and strain, stress, invariants, constitutive equations. Elastic, viscoelastic, elastic-plastic, and viscoplastic tension; technical beam theory; eccentric bending; buckling; torsion. Failure criteria and failure mechanisms. Prerequisite: CE 166, 167. (As arranged)

190 **Legal and Economic Aspects of Engineering** (2)

Laws relating to engineering practice, preparation of contract documents and specifications, consideration of economic factors in engineering design decisions. (Spring)

191 **Metal Structures** (3)
(Formerly Structural Design)

Principles of the design of metal structures; structural elements; connections; specific problems of analysis; methods of construction. (Fall)

192 **Reinforced Concrete Structures** (3)
(Formerly Structural Design)

Principles of the design of reinforced concrete structures. Details of reinforcement of structural elements. Monolithic structures; precast elements; methods of construction. (Spring)

193 **Hydraulics and Hydrology** (3)
(Formerly Design of Hydraulic Structures)

Fluid transport in open and closed conduits. Gravity waves; theory of ground water movement; elements of surface hydrology; rainfall and runoff; groundwater hydrology. Civil engineering and hydrogeological

applications of seepage, drainage, sea water intrusion in coastal areas, well flow, etc. Statistical hydrology. (Fall)

194 Environmental Engineering (3)
(Formerly CE 197 Sanitary Engineering)
Design aspects of water supply and waste-water disposal, water quality and water treatment processes, characteristics of sewage and its treatment processes. Prerequisite: CE 193 and senior status. (Spring)

195 Urban Transportation Engineering (3)
Relation of transportation to urban planning; transport systems; transportation planning and design, including surveys, data analysis, economics and coordination of systems. Prerequisite: senior status. (Fall)

196 Structural Safety and Reliability (3)
(Formerly Introductory Structural Reliability)
Aspects of probabilistic structural analysis; safety and the probability of structural failure, reliability, probability distributions of physical relevance; statistics of extremes; structural response to stochastic forces, decision rules for optimal design, coastal engineering and other applications. Prerequisite: senior status. (As arranged)

197 Waste and Pollution Control (3)
Disposal of sewage; biological treatment; chemical treatment; filtration, activated sludge; sludge handling and disposal. Control of industrial wastes and of nuclear waste products. Solid waste disposal. (As arranged)

198 Research (1 to 3)
Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status. (Fall and spring)

MECHANICAL ENGINEERING—UNDERGRADUATE STUDY

Mechanical engineering has become increasingly comprehensive in the range of its activities. The mechanical engineering curriculum provides a background for careers in research, design, development, and manufacturing in a wide variety of industries. The mechanical engineer is concerned with the behavior and processing of materials; the analysis and design of energy systems; the physical behavior and use of fluids; and the construction of mechanical systems —mechanisms, machines, control systems, power devices.

Course offerings in the field of mechanical engineering (beyond those in the first four semesters) are divided into three major groups: mechanics and materials, thermal and fluid sciences, mechanical systems and design. The program of study outlined below is based on the concept that the mechanical engineer must be prepared to meet the challenge of ever-increasing technical and economic problems. The first four semesters are common to all undergraduate fields in the School.

The four-year undergraduate curriculum has been designated to provide a fairly comprehensive basic mechanical engineering education. The preparation is adequate for beginning the practice of mechanical engineering upon graduation, and provides the essential knowledge for registration as required by law for practice as a professional mechanical engineer.

The program also serves as preparation for graduate study in any specialized fields of mechanical engineering.

CURRICULUM

First Semester

Ap S 1: Engineering in Modern Society (1)
Engl 1 or 1x: English Composition (3)
Math 30: Precalculus (3)
Phys 1: General Physics (4)
Elective: Selected from humanities or social sciences (3)

Second Semester

Ap S 2: Engineering in Modern Society (1)
EE 51: Applications of Computers (3)
Math 31: Calculus of One Variable (3)
Phys 2: Introduction to Modern Physics (4)
Elective: Selected from humanities or social sciences (3)

Third Semester

Chem 13: General Chemistry (4)
E Ad 115: Probabilistic and Statistical Methods in Engineering (3)
Math 32: Calculus of Several Variables (3)
Phys 31: Introduction to Theoretical Physics (2)
Phys 51: Introduction to Experimental Physics (2)
Elective: Selected from humanities or social sciences (3)

Fourth Semester

AP S 59: Introductory Analytical Mechanics (4)
Ap S 113: Engineering Analysis I (3)
CE 140: Materials Science (3)
Phys 32: Introduction to Theoretical Physics (2)
Phys 52: Introduction to Experimental Physics (2)
Elective: Selected from humanities or social sciences (3)

Fifth Semester

Ap S 114: Engineering Analysis II (3)
CE 120: Introduction to the Mechanics of Solids (4)
EE 11: Linear Networks I (3)
ME 131: Thermodynamics (3)
Elective: Selected from humanities or social sciences (3)

Sixth Semester

EE 20: Introductory Engineering Electronics (3)
ME 120: Methods of Engineering Experimentation (2)
ME 126: Fluid Mechanics (3)
ME 134: Dynamics of Linear Systems (3)
ME 148: Thermodynamic Analysis (3)
Elective: Selected from humanities or social sciences (3)

Seventh Semester

CE 166: Materials Engineering (2)
CE 167: Mechanics of Materials Laboratory (1)

ME 155: Compressible Fluid Flow (3)
ME 161: Advanced Dynamics (3)
or
Technical elective (3)
ME 171: Mechanics of Deformable Solids I (3)
ME 187: Heat Transfer Theory (3)
ME 191: Mechanical Design (3)

Eighth Semester

EE 172: Control Systems (3)
ME 152: Mechanical Engineering Laboratory (2)
ME 176: Environmental Engineering Problems (3)
ME 180: Propulsion (3)
or
Technical Elective (3)
ME 193: Engineering Systems Design (3)
ME 194: Energy Conversion (3)

COURSES

120 **Methods of Engineering Experimentation** (2)

Engineering reports and presentation of experimental information. Intro duction and demonstration of various types of measuring equipment, in cluding strain gages, oscilloscopes, transducers, etc. Laboratory include introduction to experimental techniques and experiments designed for the purpose of familiarization with basic equipment. Prerequisite: Phys 51 52. (Spring)

126 **Fluid Mechanics** (3)

Basic laws of incompressible fluid flow and their application; introductio to boundary layer theory. Prerequisite: Ap S 59. (Spring)

131 **Thermodynamics** (3)

Fundamental thermodynamic concepts from classical and statistical view points; thermal equilibrium and temperature; the first law of thermo dynamics, energy analysis of thermodynamic systems. Approach to equilibrium, entropy and the second law of thermodynamics, analysis o thermodynamic systems. Prerequisite or concurrent registration: Ap S 59 (Fall)

134 **Dynamics of Linear Systems** (3)

Vibration of single- and multiple-degree of freedom linear systems, tran sient and steady-state analysis, vibration of distributed parameter systems and solution by numerical methods. Prerequisite: Ap S 59, 114. (Spring)

148 **Thermodynamic Analysis** (3)

Application of thermodynamics to engineering systems, irreversibility and availability, thermodynamic potentials and criteria of equilibrium. Analy sis of thermodynamic cycles; power and refrigeration cycles, air-standard cycles; nonreactive gas mixtures; thermodynamics of reactive mixtures. Prerequisite: ME 131. (Spring)

152 **Mechanical Engineering Laboratory** (2)

Emphasis on experimental projects involving problem definition, analysis, data acquisition and reduction, and the formal report; design of ex

experiments or modification of existing experiments in the mechanical, fluid, and thermal areas is encouraged. Prerequisite: ME 120. (As arranged)

155 Compressible Fluid Flow (3)

Basic laws of compressible fluid flow, with application to nozzles, pipe flow, and fluid machinery; introduction to thin airfoil theory. Prerequisite: ME 126, 131. (Fall)

161 Advanced Dynamics (3)

Review of rigid body dynamics and Euler's equations; balancing of rotating shafts; motion about a fixed point, Euler's angles; spinning top and the theory of the gyroscope; Lagrange's equations for particles, rigid bodies, and systems; introduction to kinematic analysis and synthesis of mechanisms. Prerequisite: ME 134. (Fall)

171 Mechanics of Deformable Solids I (3)

Introduction to theory of elasticity. Derivation of basic equations; torsion and pure bending of slender members of arbitrary cross section, membrane analogy; two-dimensional problems; Airy stress function, stress concentrations; minimum energy principles. Prerequisite: CE 120. (Fall)

172 Mechanics of Deformable Solids II (3)

Theory of plasticity. Stress and strain deviators; invariants, criteria for yielding; Lode variables; plastic stress-strain relations; stresses in elasto-plastic tubes; twisting of elasto-plastic bars; basic concepts of slip line fields; introduction to creep. Prerequisite: CE 120. (As arranged)

176 Environmental Engineering Problems (3)

Kinds and sources of air, thermal, and noise pollution; abatement of pollution. Prerequisite: senior status. (Spring)

180 Propulsion (3)

Basic principles of operation and performance of propulsion systems—including turbojet, turboprop, turbofan, and ramjet—gas turbines and compound engines; combustion chamber processes; liquid and solid propellant chemical rockets. Prerequisite: ME 148, 155. (Spring)

187 Heat Transfer Theory (3)

Steady- and unsteady-state heat conduction; analytical, analog, and numerical solutions. Convective heat transfer, boundary layer approach, analogy between heat and momentum transfer; thermal radiation, heat transfer by radiation between surfaces; design and selection of heat exchangers. Prerequisite: Ap S 114, ME 126. (Fall)

191 Mechanical Design (3)

Introduction to design concept, selection of materials, and strength of mechanical elements; design of machine components such as shafts, springs, bearings, gears, couplings, screws, and related mechanical components. Prerequisite: senior status. (Fall)

193 Engineering Systems Design (3)

Principles of creative design and systems design concept; computer-aided design; design project involving the complete design of a mechanical engineering device. Prerequisite: ME 191. (Spring)

194 **Energy Conversion** (3)

Principles of steady-state energy conversion; basic ideas of quantum physics and introduction to semiconductors; analyses of thermoelectric, photovoltaic, thermionic, and magnetohydrodynamic generators and fuel cells. Prerequisite: EE 20, ME 148. (Spring)

198 **Research** (1 to 3)

Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status. (Fall and spring)

GRADUATE STUDY

Dynamic developments in science and technology during the past two decades and, most likely, in decades to come, will require that the engineer keep pace with newly emerging technological disciplines, as well as with new techniques in analysis, design, and computation. Under these circumstances, it is evident that graduate education in advanced technology will assume a vital, if not an absolutely indispensable, responsibility in answering the needs of a technologically oriented society and world. Amidst this proliferation of knowledge and technological specialty, the School adheres to the principle that versatility and depth in scientific fundamentals should be the characteristic features of any graduate program of study that attempts to prepare the graduate student to cope with the engineering developments of today and of the future.

The graduate program in the Department of Civil, Mechanical, and Environmental Engineering is quite diverse, encompassing the broad areas of solid mechanics, structural engineering, geotechnics and foundation engineering, environmental engineering, and the thermal and material sciences, as well as fluid mechanics and aerospace engineering. Within these broad categories are programs of study and research in the elasticity, inelasticity, and fracture of solids; the mechanics of continua; the structure and properties of materials; the theory of plates, shells, and elastic stability; vibrations; advanced structural analysis and design, including structural reliability; nonlinear structural behavior and dynamic loading of structures; soil mechanics; classical and statistical thermodynamics; heat and mass transfer; energy conversion; combustion processes; incompressible, compressible, laminar viscous, and hypersonic flow; gas dynamics and reaction kinetics; analytical and nonlinear mechanics; advanced dynamics; space flight and celestial mechanics; dynamic stability of flight structures; propulsion systems; and aerothermochemistry. Depending upon the interest of the student, some of the programs leading to the degree of Master of Science are given at the NASA-Langley Research Center, Langley Station, Hampton, Virginia. NASA-Langley's extensive scientific and engineering facilities and equipment are utilized whenever feasible. Arrangements can also be made to use the facilities and equipment of the Naval Ship Research and Development Laboratory, Annapolis, Maryland, where an off-campus Master's degree pilot program has been initiated.

Programs of study are flexible and can be interdisciplinary in nature with provision for collateral study in related areas offered by other departments of the School and the University. Each program is arranged to fit the individual needs and interests of the graduate student, and at the same time to utilize effectively his previous experience and background. This background should normally include an undergraduate degree in engineering, the physical

sciences, or applied mathematics. Each graduate student is assigned a faculty adviser on the basis of his study interests, thereby enabling a close student-faculty relationship to develop during the course of his program.

FIELDS AND AREAS OF CONCENTRATION

Programs of study in any field of concentration will generally include courses from appropriate allied areas.

Acoustics*

Engineering Mechanics

*270	Introduction to Acoustics	*278	Psychological and Physiological Acoustics
*271–72	Random Process Theory I, II	*280	Special Topics in Acoustics
*275	Advanced Theoretical Acoustics	298	Research
*277	Physical Acoustics	299–300	Thesis Research

Mechanical Engineering

215	Theory of Vibrations	221	Intermediate Fluid Mechanics

Aerospace Engineering*

Engineering Mechanics

217	Analytical Mechanics	*265	Dynamic Stability of Airplanes
220	Nonlinear Mechanics	298	Research
*262	Mechanics of Space Flight	299–300	Thesis Research
*263	Atmospheric Physics for Engineers		

Mechanical Engineering

*283	Advanced Propulsion Systems	*293–94	Aerothermochemistry I, II

Fluid Mechanics

Applied Science

211–15 Mathematical Methods in Applied Science, I, II, III, IV, V

Civil Engineering

275 Special Topics in Ocean Engineering

Electrical Engineering

133	Electromagnetic Waves	230	Magnetohydrodynamics

Engineering Mechanics

228 Physical Oceanography

* Offered at NASA-Langley Research Center; may be offered on campus when arranged

Mechanical Engineering

218 Design of Floating and Submerged Marine Vehicles
221 Intermediate Fluid Mechanics
227 Viscous Flow
231 Hydrodynamics
235 Compressible Flow
285 Reaction Kinetics
288 Convective Heat and Mass Transfer
289 Radiative Heat Transfer
297 Special Topics in Fluid Mechanics
298 Research
299–300 Thesis Research
315 Hypersonic Flow
317 Physical Gas Dynamics
398 Advanced Reading and Research
399 Dissertation Research

Geotechnics and Foundation Engineering

Applied Science

211, 13 Mathematical Methods in Applied Science I, III

Civil Engineering

204 Applied Soil Mechanics
205 Advanced Soil Mechanics
206 Foundation Engineering
207 Special Topics in Soil Mechanics
208 Rock Mechanics
209 Advanced Theoretical Soil Mechanics
213 Structural Design for Dynamic Loads
258 Design of Fixed Maritime Structures
298 Research
299–300 Thesis Research
398 Advanced Reading and Research
399 Dissertation Research

Engineering Mechanics

221–22 Theory of Elasticity I, II
256 Introduction to the Theories of Inelastic Media
285 Finite Element Methods in Engineering Mechanics

*Geology**

122 Structural Geology
147 Chemical Geology in the Earth and Ocean Sciences
163 Sedimentation
187–88 Geophysics for Geologists I, II
224 Advanced Structural Geology

Mechanical Engineering

221 Intermediate Fluid Mechanics

Mechanical Engineering Design

Electrical Engineering

250 Application of Numerical Methods

* For Geology course descriptions, see the *Undergraduate and Graduate Catalogue*.

Mechanical Engineering

161	Advanced Dynamics	246	Electromechanical Control Systems
218	Design of Floating and Submerged Marine Vehicles	247	Fluidics
221	Intermediate Fluid Mechanics	251–52	Transportation
225–26	Turbomachinery I, II	260	Design of Complex Systems
240	Kinematic Synthesis	298	Research
241	Engineering Systems Design	299–300	Thesis Research
243	Advanced Mechanical Engineering Design		

Ocean Engineering

Applied Science

211, 13, 14	Mathematical Methods in Applied Science I, III, IV

Civil Engineering

203	Prestressed Concrete Structures	275	Special Topics in Ocean Engineering
206	Foundation Engineering	298	Research
207	Special Topics in Soil Mechanics	299–300	Thesis Research
258	Design of Fixed Maritime Structures	398	Advanced Reading and Research
		399	Dissertation Research

Engineering Mechanics

228	Physical Oceanography

*Geology**

147	Chemical Geology in the Earth and Ocean Sciences	181–82	Oceanography I, II
		241	Geochemistry

Mechanical Engineering

218	Design of Floating and Submerged Marine Vehicles	227	Viscous Flow
221	Intermediate Fluid Mechanics	237	Propulsion I
		260	Design of Complex Systems

Propulsion

Applied Science

211, 13, 15	Mathematical Methods in Applied Science I, III, V

Electrical Engineering

133	Electromagnetic Waves	230	Magnetohydrodynamics

* For Geology course descriptions, see the *Undergraduate and Graduate Catalogue*.

Mechanical Engineering

218 Design of Floating and Submerged Marine Vehicles
221 Intermediate Fluid Mechanics
225–26 Turbomachinery I, II
227 Viscous Flow
235 Compressible Flow
237–38 Propulsion I, II
281 Nonequilibrium Thermodynamics
284 Combustion Processes
285 Reaction Kinetics
287 Heat Conduction
288 Convective Heat and Mass Transfer
291 Energy Conversion
298 Research
299–300 Thesis Research
398 Advanced Reading and Research
399 Dissertation Research

Solid Mechanics and Materials Science

Applied Science

211–15 Mathematical Methods in Applied Science I, II, III, IV, V

Civil Engineering

208 Rock Mechanics
209 Advanced Theoretical Soil Mechanics
252 General Structural Dynamics

Engineering Mechanics

217 Analytical Mechanics
221–22 Theory of Elasticity I, II
232 Advanced Materials Science
234 Composite Materials
236 Wave Propagation in Solids
240 Fracture Mechanics
256 Introduction to the Theories of Inelastic Media
259 Nonlinear Mechanics of Continua
285 Finite Element Methods in Engineering Mechanics
290 Special Topics in Nonlinear Mechanics of Continua
298 Research
299–300 Thesis Research
398 Advanced Reading and Research
399 Dissertation Research

Mechanical Engineering

221 Intermediate Fluid Mechanics
280 Advanced Thermodynamics
281 Nonequilibrium Thermodynamics

Structural Engineering

Applied Science

213–14 Mathematical Methods in Applied Science III, IV

Civil Engineering

202 Design of Reinforced Concrete Structures
203 Prestressed Concrete Structures
206 Foundation Engineering
210 Methods of Structural Analysis
211 Engineering Aspects of Waste Control
213 Structural Design for Dynamic Loads
252 General Structural Dynamics
254 Special Topics in Structural Mechanics
258 Design of Fixed Maritime Structures

Civil Engineering

261 Analysis of Plates and Shells
262 Design of Plate and Shell Structures
263 Theory of Structural Stability
298 Research
299–300 Thesis Research
398 Advanced Reading and Research
399 Dissertation Research

Engineering Mechanics

221 Theory of Elasticity I
234 Composite Materials
240 Fracture Mechanics
285 Finite Element Methods in Engineering Mechanics

Thermal Sciences

Applied Science

211–15 Mathematical Methods in Applied Science I, II, III, IV, V

Mechanical Engineering

221 Intermediate Fluid Mechanics
227 Viscous Flow
280 Advanced Thermodynamics
281 Nonequilibrium Thermodynamics
284 Combustion Processes
285 Reaction Kinetics
287 Heat Conduction
288 Convective Heat and Mass Transfer
289 Radiative Heat Transfer
291–92 Energy Conversion
295 Statistical Thermodynamics
296 Special Topics in Heat and Mass Transfer
298 Research
299–300 Thesis Research
398 Advanced Reading and Research
399 Dissertation Research

Urban Environmental Engineering

Civil Engineering

201 Design of Metal Structures
202 Design of Reinforced Concrete Structures
203 Prestressed Concrete Structures
204 Applied Soil Mechanics
206 Foundation Engineering
214 Water Resources Engineering
215 Urban Construction Technology
220 Transportation Engineering
223 Traffic Engineering
298 Research
299–300 Thesis Research

Engineering Administration

204 Administration of Engineering Contracts
207 Personnel Administration
210 Engineering Law
261 Economic Analysis in Engineering Planning

Mechanical Engineering

251–52 Transportation
260 Design of Complex Systems

*Political Science**

103 State and Local Governments

* P Sc 103 is prerequisite to all Urban and Regional Planning courses. For Political Science and Urban and Regional Planning course descriptions, see the *Undergraduate and Graduate Catalogue*.

*Urban and Regional Planning**

203 Fundamentals of Urban Design
204 Urban Development Planning
205 Seminar: Urban Housing
207 Land Development Planning
208 Urban Transportation Planning

CIVIL ENGINEERING COURSES

201 Design of Metal Structures (3)
(Formerly Metal Structures)

Structural behavior and failure of metal structures; conception and design of structural systems for various cases, including low- and high-rise buildings, long-span structures, bridges, suspended roofs, and special structures. Prerequisite: approval of Department. (1971–72 and alternate years: fall)

202 Design of Reinforced Concrete Structures (3)
(Formerly Ultimate Strength of Reinforced Concrete Structures)

Modes of failure of reinforced concrete structures; selection of appropriate structural system; design of slabs, frames, folded plate roofs, shell structures, and other special structures. Prerequisite: approval of Department. (1972–73 and alternate years: fall)

203 Prestressed Concrete Structures (3)

Structural behavior and failure modes of prestressed concrete structures; design in prestressed concrete, including long-span structures, bridges, and precast systems. Prerequisite: approval of Department. (1972–73 and alternate years: spring)

204 Applied Soil Mechanics (3)
(Formerly Geotechnics in Soil Mechanics)

Theories of soil strength; bearing capacity of shallow foundations and their design; deep foundations, including pile types and design criteria; theories of lateral earth pressure with applications; stability analyses of slopes. Selected experiments in the soil mechanics laboratory. Prerequisite: approval of Department. (1971–72 and alternate years: spring)

205 Advanced Soil Mechanics (3)
(Formerly Theoretical Soil Mechanics)

Nature of soil, including geological and pedological aspects; flow of water in soil; seepage involving foundations, dams, and wells; stress distribution in earth masses; one- and three-dimensional theories of consolidation; analysis of settlement. Selected experiments in the soil mechanics laboratory. Prerequisite: approval of Department. (1971–72 and alternate years: fall)

206 Foundation Engineering (3)

Principles of soil mechanics and structural mechanics applied to the analysis and design of spread footings and mat foundations, pile foundations, retaining structures, including sheeting and bracing systems, and waterfront structures. Problems associated with subsurface exploration, dewatering excavations, and underpinning. Prerequisite: approval of Department. (1972–73 and alternate years: spring)

* P Sc 103 is prerequisite to all Urban and Regional Planning courses. For Political Science and Urban and Regional Planning course descriptions, see the *Undergraduate and Graduate Catalogs*

207 **Special Topics in Soil Mechanics** (3)

Selected topics in soil mechanics of current interest, such as soil rheology, soil dynamics, computer applications, excavation with nuclear explosives, and ocean bottom sediments. May be repeated for credit. Prerequisite: approval of Department. (1972–73 and alternate years: fall)

208 **Rock Mechanics** (3)

Elasticity and anelasticity of rock. Long-time deformation effect of hydrostatic pressure. Crack and fracture mechanisms; layered media; strain-waves; laboratory testing; underground measurements; weathered rock and granular aggregates. Geological and engineering applications. (Fall)

209 **Advanced Theoretical Soil Mechanics** (3)

Mechanics of continua and their relation to and application in soil mechanics; theories of failure and stability; theories of consolidation; problems of seepage. Prerequisite: Ap S 211; CE 204, 205; EM 256. (1971–72 and alternate years: fall)

210 **Methods of Structural Analysis** (3)

(Formerly Analysis of Structures)

Classical and modern methods of analysis of statically indeterminate structures, including matrix analysis, variational methods, finite elements, theory of plastic collapse and shakedown. Prerequisite: graduate status. (Fall)

211 **Engineering Aspects of Waste Control** (3)

Hydraulics and design of sewer systems; sewage treatment and sewage disposal; control of industrial and nuclear wastes; biological, chemical, and related physical processes. (Fall)

213 **Structural Design for Dynamic Loads** (3)

Design of structures for dynamic and impact forces; wind loads, wave forces, earthquake and blast loads; design of structural elements in concrete and steel; details of connections; discussion of specific problems. Prerequisite: approval of Department. (1971–72 and alternate years: spring)

214 **Water Resources Engineering** (3)

Water supply systems. Storage and run-off control. Surface and ground water collection. Water purification; water transmission and distribution. Pollution control and sanitation of rivers, lakes, and estuaries. (Fall)

215 **Urban Construction Technology** (3)

Modern designs and construction techniques for the city; modular construction; construction management and planning. Prerequisite: approval of Department. (1972–73 and alternate years: spring)

220 **Transportation Engineering** (3)

Elements of transportation technology: mass transportation systems, airports, highways, inland waterways. Problems of design and construction. Prerequisite: approval of Department. (1971–72 and alternate years: spring)

223 Traffic Engineering (3)

Problems of traffic forecasting and planning for the various modes of transportation. Impact on and interaction with urban planning. Prerequisite: E Ad 115 or equivalent and approval of Department. (1972–73 and alternate years: fall)

252 General Structural Dynamics (3)

Analysis of elastic structures under dynamic loadings—steady-state, transient, and stochastic; vibrations of rigid frames, plates, and thin shells. Stochastic load processes—wind, earthquake, sea; failure under stochastic loading—first exceedance, damage accumulation. Prerequisite: approval of Department. (Fall)

254 Special Topics in Structural Mechanics (3)

Selected problems in structural mechanics, including finite element techniques, thermal stresses in one- and two-dimensional structures, impact of elastic bodies, and other current topics of interest. Prerequisite: CE 210 or approval of Department. (1972–73 and alternate years: spring)

258 Design of Fixed Maritime Structures (3)

Wave forces. Interaction between structures and waves; design of flexible structures—piers, off-shore platforms, jetties; design of rigid structures—breakwaters and seawalls; shore protection structures; moorings and cables. Prerequisite: CE 206 or equivalent; EM 228. (Spring)

261 Analysis of Plates and Shells (3)

(This course replaces former CE 255 Analysis of Plate Structures (3) and 256 Analysis of Shell Structures (3))

Bending and stretching of thin elastic plates under loading with various boundary conditions, continuous plates and plates on elastic foundations, theory of folded plate structures. Theory of curved surfaces; general linear bending theory and its simplification to membrane theory; bending stresses in shells of revolution, shallow shell theory. Specific applications. Prerequisite: approval of Department. (Fall)

262 Design of Plate and Shell Structures (3)

Design of long-span plate and shell roof structures in reinforced concrete and metal; design of containers for fluids and granular materials; computer applications in the analysis of such structures. Prerequisite: approval of Department. (1972–73 and alternate years: spring)

263 Theory of Structural Stability (3)

(This course replaces former CE 263 (3) and 264 (3))

General criteria for stability; buckling of elastic, plastic, and viscoelastic columns and frames; torsional and lateral buckling; variational methods. Buckling of plates and shells under static and dynamic loads, stability of stiffened structures, effect of imperfections and boundary conditions. Prerequisite: approval of Department. (Spring)

275 Special Topics in Ocean Engineering (3)

Selected problems of current interest in ocean engineering, such as materials and design criteria for hydrospace structures, dynamics of currents and waves, anchors and foundations of the ocean bottom, and life support equipment. (1972–73 and alternate years: spring)

298 **Research** (arr.)

Basic research projects, as arranged. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3)
(Fall and spring)

398 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.)

Limited to Doctor of Science candidates. May be repeated for credit. (Fall and spring)

ENGINEERING MECHANICS COURSES

217 **Analytical Mechanics** (3)

Fundamental principles, generalized coordinates, variational principles and Lagrange's equations, nonholonomic systems, Hamilton's equations, theory of small oscillations. Prerequisite or concurrent registration: Ap S 211. (Spring)

220 **Nonlinear Mechanics** (3)

Topological and analytical methods in nonlinear mechanics, nonlinear resonance, relaxation oscillations. Prerequisite: EM 217. (1972–73 and alternate years: spring)

221 **Theory of Elasticity I** (3)

Infinitesimal strain and compatibility; stress, constitutive relations for isotropic solids, displacement and stress formulation of boundary value problems, energy principles, the reciprocal theorem, elements of pure torsion and flexure of rods; plane problems in elastostatics and dynamics illustrating stress function and Fourier transform methods. Prerequisite: approval of Department. (Fall)

222 **Theory of Elasticity II** (3)

Complex variable methods in plane static and dynamic problems; introduction to three-dimensional elastostatics, displacement potentials of Kelvin, Papkovich, and Galerkin; classical problems of Kelvin, Boussinesq, and Mindlin; Love's strain function and integral transform methods for axially symmetric problems; Somogliana and Betti integrals. Introduction to thermoelasticity. Prerequisite: Ap S 211, Ap S 213 (which may be taken concurrently), EM 221. (Spring)

228 **Physical Oceanography** (3)

Seawater, equations of motion, interaction between air and sea, currents, wind-waves in deep and shallow waters, long ocean waves, tides, wave-statistics, sea ice. Prerequisite: ME 221 or equivalent. (1972–73 and alternate years: fall)

*231 **Solid State for Engineers** (3)

Crystal structure and binding, elastic constants, lattice vibrations, thermal properties, free electron theory of metals, band theory of solids, semiconductors, rectifiers and transistors, superconductivity. Prerequisite: approval of Department. (1972–73 and alternate years: fall)

*Offered at NASA-Langley Research Center; may be offered on campus when arranged.

232 Advanced Materials Science (3)

Simple crystal structures; the defect crystal structure—point defects, line defects, surface defects; grain-boundaries; X-ray and electron diffraction. diffusion in solids, metallic solutions, and compounds; ceramics; polymeric materials; elastic properties; internal friction; geometry, statics and dynamics of dislocations; microplasticity, plasticity, work-hardening, and fatigue. creep; strengthening mechanisms; radiation damage; cohesive strength Prerequisite: approval of Department. (Fall)

234 Composite Materials (3)

Principles of composites and composite reinforcement; micromechanics and failure; interface reactions in various composites; reinforcing materials; structure of composites—fiber-reinforced polymers, filler-reinforced polymers, fiber-reinforced metals, directionally solidified alloys, dispersion-strengthened metals. Prerequisite: approval of Department. (Spring)

***235 Physical Metallurgy (3)**

Relations among structures, properties, and reactions of metals and alloys; structures and equilibria, kinematics of physical and chemical reactions; plastic deformation mechanisms, diffusion, solid reactions; phase diagrams and phase transformations, recrystallization and grain growth; dislocations—their formation and multiplication in crystal structures; elementary strengthening mechanisms. Prerequisite: EM 232 or approval of Department. (1972–73 and alternate years: fall)

236 Wave Propagation in Solids (3)

Small amplitude plane and spherical wave propagation in unbounded elastic media; dilational, shear, and surface waves; reflection and refraction of plane waves; free waves in finite bodies. Prerequisite: EM 221 or approval of Department.

***237 Quantum Mechanical Treatment of Metals (3)**

Elements of quantum mechanics, including Schroedinger equation and elementary perturbation theory. Applications to basic processes in the theory of solids: lattice waves, electron states, electron-electron and electron-phonon interactions. Boltzmann equation and transport properties. Fermi surfaces; theory of superconductivity. Prerequisite: EM 231 or approval of Department. (1972–73 and alternate years: spring)

***239 Physical Ceramics (3)**

Crystal chemistry and the systematic study of the structure of ceramic materials; solid reactions occurring at elevated temperatures; sintering vitrification, diffusional mechanisms and effects; reaction rate theory. elastic, anelastic, and plastic properties of ionic and covalent solids; viscoelastic behavior of vitreous and vitreous-solid systems; phase equilibria of ceramic systems. Prerequisite: approval of Department. (1972–73 and alternate years: spring)

240 Fracture Mechanics (3)

Fundamentals of brittle fracture, Griffith theory and extensions. mechanics of fracture, linear elastic systems, plasticity considerations, fracture toughness, engineering analysis, notch strength analysis with limit approach.

* Offered at NASA-Langley Research Center; may be offered on campus when arranged.

crack propagation laws, fatigue, fracture testing, comparison of recent continuum theories. Prerequisite: approval of Department. (Spring)

256 Introduction to the Theories of Inelastic Media (3)

Physical basis of anelasticity, viscoelasticity, plasticity, and viscoplasticity; constitutive equations of elastic and viscoelastic media; foundations of the theories of plasticity and viscoplasticity; one- and two-dimensional boundary value problems in linear-visco-elastic and elastic-plastic media; the rigid-plastic medium; simple problems in nonlinear viscous and visco-plastic media; wave propagation in inelastic media. Prerequisite: approval of Department. (Fall)

259 Nonlinear Mechanics of Continua (3)

Development of fundamental concepts of nonlinear media and their applications. Prerequisite: Ap S 212 and EM 221, or EM 256. (Spring)

***262 Mechanics of Space Flight (3)**

First- and second-order Hamiltonian-Jacobi perturbation theory applied to artificial satellites, von Zeipel's methods, special and general perturbation theories for third-body perturbations. Differential correction or orbits by weighted least squares and minimum variance techniques. Comparison of various filtering techniques as applied to orbit determination and other space flight parameter estimation. Prerequisite: EM 217 or approval of Department. (As arranged)

***263 Atmospheric Physics for Engineers (3)**

Introduction to physical processes in the earth's atmosphere; comparisons to the atmospheres of other planets. Topics: evolution, structure, dynamics, visible phenomena, the ionosphere, and radiation processes. Prerequisite: approval of Department. (As arranged)

***265 Dynamic Stability of Airplanes (3)**

Derivation of equations of motion, Euler transformations and direction cosines, stability derivatives and linearization of equations of motion, stability of linear systems with application to longitudinal and lateral dynamics, Laplace transform techniques and frequency response analysis. Prerequisite: EM 217 or approval of Department. (As arranged)

***270 Introduction to Acoustics (3)**

Waves in an infinite medium, energy and intensity, transmission in layered media, source and dipole fields, electrical and acoustical analogies, resonators, horns and wave guides, normal modes and sound sources in ducts, physiological and architectural acoustics. Prerequisite: approval of Department. (As arranged)

***271 Random Process Theory I (3)**

(This course, together with EM 272, replaces former EM 276)

Probability theory and distributions; random variables and types of random processes; relations between correlation functions, power spectra, and indicial response; measurement and use of power spectra; behavior of physical systems under random inputs. Prerequisite: approval of Department. (As arranged)

*Offered at NASA-Langley Research Center; may be offered on campus when arranged.

***272 Random Process Theory II (3)**

(This course, together with EM 271, replaces former EM 276)

Discrete and continuous state Markov-processes; chains, queues, diffusion, and passage problems; linear and nonlinear estimation and stochastic control; estimation of correlations and power spectra; applications in communication theory; scattering from random surfaces; stochastic linearization and stability. Prerequisite: EM 271. (As arranged)

***275 Advanced Theoretical Acoustics (3)**

Classical scattering and diffraction problems, coupled acoustical and mechanical systems, acoustics of moving sources, propeller noise, principle of least time, Snell's law and ray tracing, introduction to boundary and jet noise. Prerequisite: EM 270, ME 215. (As arranged)

***277 Physical Acoustics (3)**

Waves in dissipative media, nonlinear aspects of acoustics, acoustic streaming, unsteady boundary layers, interaction of sound with turbulence, aerodynamic noise generation, atmospheric attenuation, thermal and viscous phenomena. Prerequisite: EM 275, ME 221. (As arranged)

***278 Psychological and Physiological Acoustics (3)**

Anatomy and physiology of the ear, experimental methodology in psychoacoustics, subjective responses to noise, acoustical controls and displays, effects of aircraft noise and sonic boom on people, human response criteria for noise control, effects of noise on human performance and physiology, current problems in acoustical theory and technology. Prerequisite: approval of Department. (As arranged)

***280 Special Topics in Acoustics (3)**

Current methods and problems in acoustics. Topics chosen from such areas as aerospace noise generation and control; instruments and procedures for acoustics measurements; and responses of structures, people, and communities to noise. Prerequisite: approval of Department. (As arranged)

285 Finite Element Methods in Engineering Mechanics (3)

Derivation of fundamental equations based on energy formulation; stiffness properties of basic finite elements; solution of problems in plane stress and strain, plane- and space-framed structures; plate and shell structures; elastoplastic and dynamic analysis. Prerequisite: approval of Department. (Fall)

290 Special Topics in Nonlinear Mechanics of Continua (3)

Introduction to special topics in nonlinear theories of continuous media such as the elastic dielectric, multi-polar theories, continuous theory of dislocations; crystal elasticity based on quantum-solid state considerations. Prerequisite: EM 259.

298 Research (arr.)

Basic research projects as arranged. May be repeated for credit. (Fall and spring)

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* Offered at NASA-Langley Research Center; may be offered on campus when arranged.

299–300 **Thesis Research** (3–3)

(Fall and spring)

398 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.)

Limited to Doctor of Science candidates. May be repeated for credit. (Fall and spring)

MECHANICAL ENGINEERING COURSES

215 **Theory of Vibrations** (3)

Damped and undamped natural vibrations, transient response and response to harmonic and periodic excitation, natural vibration of discrete and continuous systems; integral formulation of eigenvalue problems, response by modal analysis, approximate methods, influence of secondary effects and constraints, damped systems. Prerequisite: approval of Department. (Fall)

218 **Design of Floating and Submerged Marine Vehicles** (3)

Consideration of interaction between hydrodynamics, propulsion, and configuration aspects of design of floating structures and vehicles; effects of submergence and deep submergence; hydrofoil and vertical jet action; structural considerations. Prerequisite: EM 228. (Fall)

221 **Intermediate Fluid Mechanics** (3)

The continuum, kinematics of fluids; stress tensor, strain and rate-of-strain tensor; fundamental equations of the flow of viscous compressible fluids; Laplace's equations; source, sink, and doublet: vortices, Biot-Savart theorem and the flow field of a vortex; spherical and cylindrical harmonics; methods of singularity distributions, complex-variable methods; laminar flow of viscous incompressible fluids; boundary layer concept. Prerequisite: approval of Department. (Fall)

225 **Turbomachinery I** (3)

Review of thermodynamic principles; fundamentals of fluid flow; hydraulic power systems; steam and gas turbine cycles; turbine, compressor, and pump types; energy interchange in fluid machinery; design and characteristics of turbines, compressors, and pumps; linking of compressor and compressor turbine characteristics; combustion systems; regenerators. Prerequisite: approval of Department. (Fall)

226 **Turbomachinery II** (3)

Aerodynamics of aerofoils; flow in cascades; data for turbine calculations; axial turbine aerodynamic design; performance of compressor cascades; axial compressor aerodynamic design. Heat and mass transfer with chemical reaction; combustion of liquid fuels; combustion in pre-mixed gases; combustion without pre-mixing; gas-turbine combustion chamber design. Prerequisite: ME 225. (Spring)

227 **Viscous Flow** (3)

Exact solutions of Navier-Stokes equations; the small Reynolds number approximations, laminar boundary layer theory and the techniques for its solution, stability of laminar flows; Reynolds theory of turbulent stresses,

applications to internal and external flows, turbulent boundary layer theory; applications to heat transfer problems; flow separation. Prerequisite: Ap S 213; ME 221 or equivalent. (Fall)

231 **Hydrodynamics** (3)

Irrotational axisymmetric and planar flow problems, circulation and lift, lifting line theory, slender body theory. Introduction to gravity waves, body hydrodynamics, and incompressible jets. Prerequisite: Ap S 211, ME 221. (Spring)

235 **Compressible Flow** (3)

Thermodynamics and physical properties of gases, fundamental equations of a compressible inviscid fluid, small perturbation theory, expansions in Mach number and thickness parameters, second-order shock shapes, role of entropy in supersonic flow, shock wave interactions, hodograph transformation, Kármán-Tsien and other model gases, conical flows, transonic flow theory, method of characteristics, rotational nonisentropic flows. Prerequisite: Ap S 213; ME 221 or equivalent. (Spring)

237 **Propulsion I** (3)

Basic concepts of propulsion: energy transformations in propulsive flows; gas dynamics of combustion, detonation processes; nonuniform flows, mixing; intakes, additive drag; mechanics of flow induction; drag and thrust generation; multiple-flow thrust generators; thrust recovery and augmentation; the propulsion spectrum. Illustrative examples will include propellers, turbojets, turbofans, ramjets, and rockets. Prerequisite: approval of Department. (Fall)

238 **Propulsion II** (3)

Advanced propulsion concepts: nonsteady flows with viscosity, heat exchanges, and entropy gradients; discontinuities and interactions in nonsteady flow; gas dynamics of nonsteady combustion; static, dynamic, and cryptosteady pressure exchange; energy equalizers and dividers; nonsteady-flow thrust generators. Topics for discussion will include a variety of new flow induction and propulsion concepts. Prerequisite: ME 237. (Spring)

240 **Kinematic Synthesis** (3)

Determination of linkage proportions from prescribed input-output conditions for both path and function-generating mechanisms; critical comparison of graphical, analytical, and computer-oriented methods. Techniques are applied to the synthesis of various machines and computers. Prerequisite: approval of Department. (Spring)

241 **Engineering Systems Design** (3)

Principles of creative design and systems design; computer-aided design; design project involving the complete design of a mechanical engineering device. Prerequisite: approval of Department. (Fall)

243 **Advanced Mechanical Engineering Design** (3)

Design of mechanical engineering systems, components, and equipment; requires the integration of engineering disciplines at an advanced level. Prerequisite: approval of Department. (Fall)

246 **Electromechanical Control Systems** (3)

System synthesis, compensation, and stabilization using Bode diagrams, root locus, etc.; linear and nonlinear characterization of mechanical,

electromechanical, and electronic control components. Prerequisite: approval of Department. (Fall)

247 **Fluidics** (3)

Introduction of fluidic components and systems: behavior and modeling of bistable and proportional jet devices, vortex amplifiers and sensors, passive elements, transmission lines; system synthesis, coupling effects. Survey of current applications and research. Prerequisite: approval of Department. (Spring)

251–52 **Transportation** (3–3)

A "workshop" for the study of the problems of urban and interurban transportation; identification of the problems of mass transportation and assessment of alternative solutions. Topics for discussion include the nontechnological requirements and constraints of mass transportation and the technological problems of power supply, propulsion, support and suspension, guidance and control, guideways and stations. Prerequisite: approval of Department. (Academic year)

260 **Design of Complex Systems** (3)

Discussion of frontier problems such as salt water conversion, transportation devices and systems, systems for space and underwater exploration. Determination of specifications for these systems to meet given needs. Critical discussion of possible solutions based on technical as well as economic and social considerations. Prerequisite: approval of Department. (Spring)

280 **Advanced Thermodynamics** (3)

Statistical significance of the entropy concept, conditions of equilibrium, equilibrium of heterogeneous systems. Application of thermodynamic formalism to magnetic, electric, and solid systems; equilibrium of ionized gases; the Nernst postulate and the third law of thermodynamics. Prerequisite: graduate status. (Fall)

281 **Nonequilibrium Thermodynamics** (3)

Limitations of equilibrium thermodynamics, entropy production, phenomenological equations and linear laws; postulates of nonequilibrium thermodynamics, formulation of the equations of nonequilibrium systems, statistical foundations, stationary nonequilibrium states; selected applications. Prerequisite: ME 280. (1972–73 and alternate years: spring)

*283 **Advanced Propulsion Systems** (3)

General theory of rocket propulsion; thermodynamic fluid flow and heat transfer analysis; performance and systems analysis for space applications. Chemical rocket propulsion; liquid, solid, hybrid rockets; air-breathing propulsion. Theory of combustion stability and efficiency; nuclear propulsion, reactor control theory, criticality, diffusion analysis, and advanced concepts. Basic concepts of electrical propulsion. Current problems in advanced propulsion. Prerequisite: approval of Department. (1971–72 and alternate years: spring)

284 **Combustion Processes** (3)

Thermodynamics of combustion, chemical kinetics, flame propagation, combustion of liquids and solids, detonation processes. Prerequisite: ME 280. (1971–72 and alternate years: fall)

* Offered at NASA-Langley Research Center; may be offered on campus when arranged.

285 Reaction Kinetics (3)

Theoretical aspects of kinetics of homogeneous and heterogeneous reactions in gaseous and liquid systems. Prerequisite: ME 280. (1972–73 and alternate years: spring)

287 Heat Conduction (3)

Conduction of heat through solid, liquid, and gaseous media; formulation and methods of analytical, numerical, and analog solutions; steady two- and three-dimensional problems, problems in unsteady heat conduction, conduction in composite regions. Prerequisite: Ap S 213 or equivalent. (Fall)

288 Convective Heat and Mass Transfer (3)

Heat and momentum transfer in laminar and turbulent flow; application of boundary layer theory to problems of forced convection; the laminar boundary layer and similarity solutions; heat convection in turbulent flow; momentum-heat transfer analogy; the influence of temperature-dependent fluid properties; convective heat transfer at high velocities; mass transfer; formulation of a simplified theory; some solutions to the conserved property equation. Prerequisite: ME 221 or equivalent. (Spring)

289 Radiative Heat Transfer (3)

Nature of thermal radiation; radiative characteristics of surfaces; thermal radiation within evacuated enclosures; configuration factors algebra; solution methods for the integral equations of radiant interchange; enclosures containing an absorbing and emitting medium; absorbing, emitting, and scattering media; combined radiation, conduction, and convection. Prerequisite: Ap S 214 or equivalent. (Fall)

***290 Kinetic Theory of Gases (3)**

Equation of state and physical properties for gas composed of discrete particles; relation of kinetic theory to thermodynamics; Maxwell distribution of molecular velocities; Boltzmann H theorem. Molecular interactions, free paths, collision rates, scattering coefficients. Introduction to diffusion, viscosity, heat conduction; imperfect gases; flow of gases at low density. Prerequisite: ME 280. (1971–72 and alternate years: spring)

291–92 Energy Conversion (3–3)

Thermodynamics of energy conversion, duality of matter, semiconductor theory, thermoelectric engines, thermionic converters; magnetohydrodynamic engines, junction diodes, photovoltaic effects, solar cells, free energy fuel cells, conditions of equilibrium, construction of fuel cells. Prerequisite: graduate status. (ME 291: 1971–72 and alternate years—spring. ME 292: 1972–73 and alternate years—fall)

***293 Aerothermochemistry I (3)**

Thermodynamics of reacting systems, combustion kinetics, conservation equations, transport processes, laminar diffusion flames, laminar premixed flames, aspects of reacting inviscid flows. Prerequisite: approval of Department. (1971–72 and alternate years: fall)

***294 Aerothermochemistry II (3)**

Additional aspects of reacting inviscid flows, reacting boundary layers, heterogeneous combustion, turbulent flames, numerical methods in aer-

* Offered at NASA-Langley Research Center; may be offered on campus when arranged.

thermochemistry. Prerequisite: ME 293 or equivalent. (1971–72 and alternate years: spring)

295 Statistical Thermodynamics (3)

Distribution functions; Boltzmann, Bose-Einstein, and Fermi-Dirac statistics; partition functions, correspondence between classical and statistical thermodynamics. Systems with negligible effects of interparticle forces; perfect gases, perfect electron gas, photon gas. The Debye solid, the Einstein solid. Prerequisite: ME 280. (1971–72 and alternate years: spring)

296 Special Topics in Heat and Mass Transfer (3)

Selected heat and mass transfer problems of current interest such as temperature distribution and heat transfer rate in an ablating solid; heat transfer with boiling, two-phase flow in pipes, heat transfer to liquid metals, thermal contact resistance, heat transfer to non-Newtonian fluids. Prerequisite: approval of Department. (1971–72 and alternate years: fall)

297 Special Topics in Fluid Mechanics (3)

Selected topics in fluid mechanics of current interest, such as rarefied flow, hypersonic leading edge flow, method of series truncation, nonequilibrium wave propagation. Prerequisite: approval of Department. (1972–73 and alternate years: spring)

298 Research (arr.)

Research as arranged. May be repeated for credit. (Fall and spring)

299–300 Thesis Research (3–3)

(Fall and spring)

315 Hypersonic Flow (3)

Small-disturbance theory, Newtonian theory; constant-density solution, theory of thin shock layers, flow over blunt bodies, hypersonic viscous flow, experimental techniques. Prerequisite: ME 235. (1972–73 and alternate years: fall)

317 Physical Gas Dynamics (3)

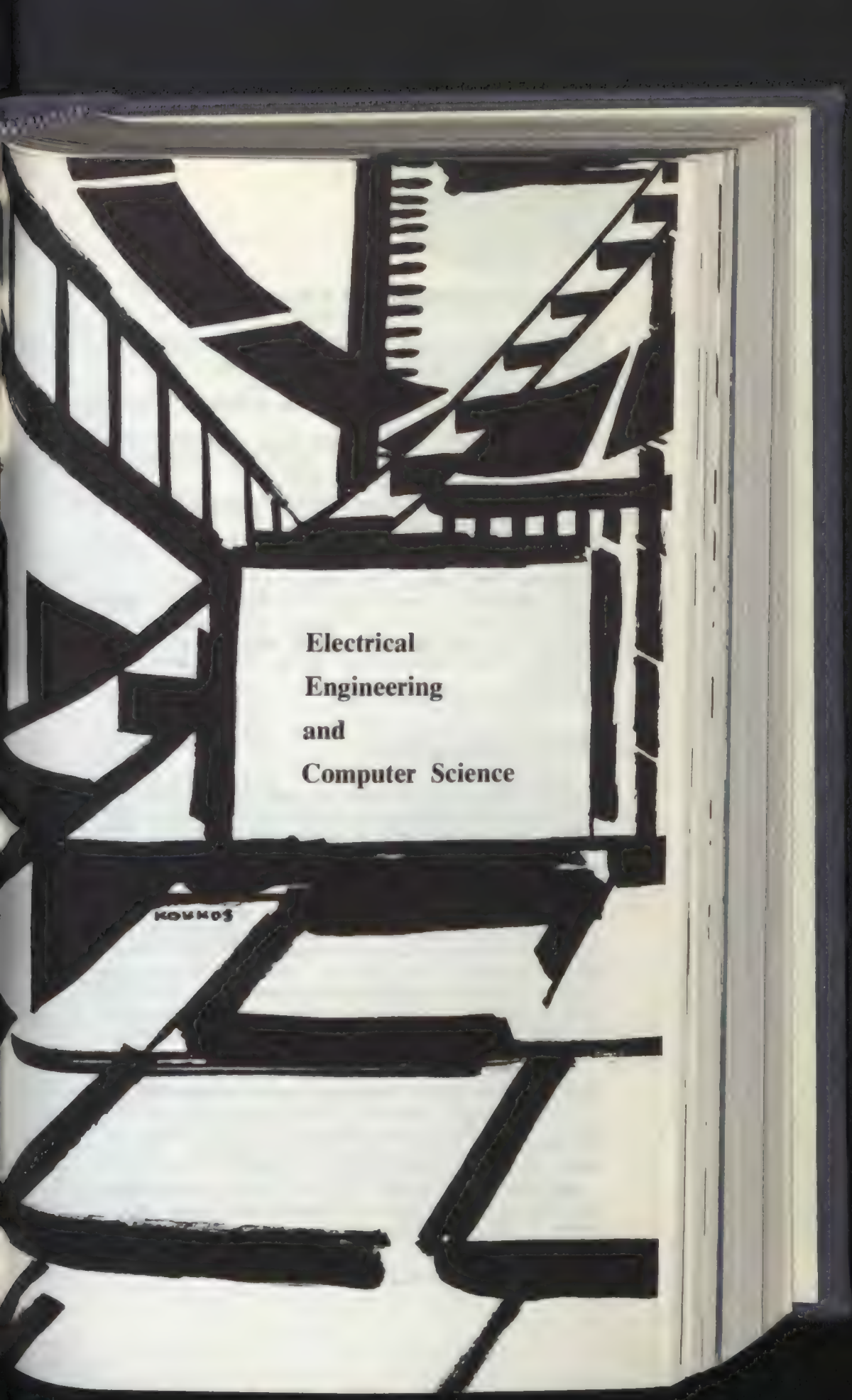
Molecular and atomic phenomena in gases, intermolecular forces, specific heats, equation of state for a real gas, dynamics of dissociating gas, radiation. Prerequisite: ME 235; 295 or equivalent. (1971–72 and alternate years: spring)

398 Advanced Reading and Research (arr.)

Limited to students preparing for the Doctor of Science qualifying examnation. May be repeated for credit. (Fall and spring)

399 Dissertation Research (arr.)

Limited to Doctor of Science candidates. May be repeated for credit. (Fall and spring)


Electrical
Engineering
and
Computer Science
KOUKOS

Electrical Engineering and Computer Science*

Professors R.B. Heller, Guenther Hintze *(Research)*, W.K. Kahn *(Chairman)*
Adjunct Professors Charles Feldman, Ernst Weber
Professorial Lecturers W.F. Crosswell, S.J. Raff
Associate Professors E.H. Braun, Marvin Eisenberg, A.C. Meltzer, Nicholas Kyriakopoulos
Associate Professorial Lecturers M.E. Brady, C.L. Fricke, J.P. Fennell, B.P Laṭhi, Wasyl Wasylkiwskyj, J.M. Clark, B.M. Horowitz, Leonard Schuchman, A.R. Shulman, Richard Van Blerkom
Assistant Professors N.A. Sloan, Vallobh Vimolvanich, Abd-elfattah Abd-alla, J.S. Huang, R.H. Lang
Assistant Professorial Lecturers D.O. Baechler, D.C. Rohlfs, J.K. Cooper, W.H. Fuhr, M.D. Aldrich, Constantine Balanis, M.M. Bruce, Maurice Morin, M.J. Celebiler, F.S. LeBeau, J.H. O'Hara, J.J. Rocchio, Jr., Bhupendraprasad Shah, Paul Willis, George Saxton, J.A. Friedhoffer, P.J. Martin, R.E. Merwin, H.F. Mitchell, Jr., J.L. Wolfgang, Jr., Pi-Fuay Chen, L.G. Hull, R.E Lyons, Neil MacGregor, Iwao Sugai, Mauricio Thomae, M.H. Chen, W.J English, Gerald Farmer, J.M. Hlavin, Elmer Lipsey, W.C. Scales, J.A. Travisano
Special Lecturer Peter Bock

UNDERGRADUATE STUDY

Electrical engineering is a branch of engineering in which practical as well as theoretical and scientific aspects are integrated to provide a well-balanced discipline. Basic sciences such as physics and mathematics form the roots on which electrical engineering builds to create a truly applied science and to develop the techniques necessary to solve problems. Analysis, synthesis, and design go hand in hand. The electrical engineering curriculum is designed to provide the student with such an integrated approach. The first two years of the curriculum are common to all undergraduate fields in the School and are devoted to developing a sound foundation of basic sciences coupled with engineering sciences. The third year continues with engineering sciences and starts going deeper into electrical engineering. The fourth year is totally devoted to electrical engineering. At the fourth year the student has a choice of either following the regular electrical engineering curriculum or branching off into an area of concentration in computer science.

The Department of Electrical Engineering and Computer Science has recently acquired modern laboratory equipment, including its own computer. The student has an opportunity during his last year to work on individual projects where his ingenuity, coupled with faculty advice and guidance, permits him to concentrate in areas such as computers, communications, microwaves, control, electronics, medical engineering, circuits, and others.

The scheduling of courses has been arranged to accommodate both the full-time and the part-time student. Undergraduate courses are offered once a year during the day for full-time students, and once every two years in the evening for part-time students.

* Staff of instruction for the academic year 1970–71.

SUBJECT AREAS

Networks

11–12 Linear Networks I, II
113 Network Analysis and Design
114 Linear Active Networks

Fields and Waves

31–32 Fields and Waves I, II
133 Electromagnetic Waves

Electronics

20 Introductory Engineering Electronics
121 Engineering Electronics and Design
122 Pulse and Waveshaping Electronic Design

Communications

143–44 Elements of Communication Engineering I, II

Computer Science

51 Applications of Computers
152 Introduction to Digital Computers
153 Design of Switching Systems
154 Digital Computer Design
155 Introduction to Numerical Methods
156 Introduction to System Programming
157 Machine and Assembly Language Programming
158 Algorithmic Methods and High-level Languages

Laboratories and Measurement

60–61 Introductory Electrical Engineering Laboratory I, II
160 Electrical Measurements
161–62 Electrical Engineering Laboratory

Controls and Systems

172 Control Systems
177 Electrical Energy Conversion

Medical Engineering

184 Introduction to Medical Engineering

CURRICULA

Electrical Engineering

First Semester

Ap S 1: Engineering in Modern Society (1)
Engl 1 or 1x: English Composition (3)

Math 30:	Precalculus (3)
Phys 1:	General Physics (4)
Elective:	Selected from humanities or social sciences (3)

Second Semester

Ap S 2:	Engineering in Modern Society (1)
EE 51:	Applications of Computers (3)
Math 31:	Calculus of One Variable (3)
Phys 2:	Introduction to Modern Physics (4)
Elective:	Selected from humanities or social sciences (3)

Third Semester

Chem 13:	General Chemistry (4)
E Ad 115:	Probabilistic and Statistical Methods in Engineering (3)
Math 32:	Calculus of Several Variables (3)
Phys 31:	Introduction to Theoretical Physics (2)
Phys 51:	Introduction to Experimental Physics (2)
Elective:	Selected from humanities or social sciences (3)

Fourth Semester

AP S 59:	Introductory Analytical Mechanics (4)
AP S 113:	Engineering Analysis I (3)
CE 140:	Materials Science (3)
Phys 32:	Introduction to Theoretical Physics (2)
Phys 52:	Introduction to Experimental Physics (2)
Elective:	Selected from humanities or social sciences (3)

Fifth Semester

Ap S 114:	Engineering Analysis II (3)
EE 11:	Linear Networks I (3)
EE 31:	Fields and Waves I (3)
EE 60:	Introductory Electrical Engineering Laboratory I (2)
ME 131:	Thermodynamics (3)
Elective:	Selected from humanities or social sciences (3)

Sixth Semester

EE 12:	Linear Networks II (3)
EE 20:	Introductory Engineering Electronics (3)
EE 32:	Fields and Waves II (3)
EE 61:	Introductory Electrical Engineering Laboratory II (2)
EE 152:	Introduction to Digital Computers (3)
Elective:	Selected from humanities or social sciences (3)

Seventh Semester

EE 113:	Network Analysis and Design (3)
EE 121:	Engineering Electronics and Design (3)
EE 133:	Electromagnetic Waves (3)
EE 143:	Elements of Communication Engineering I (3)
EE 161:	Electrical Engineering Laboratory (2)
EE 177:	Electrical Energy Conversion (3)
or EE 184:	Introduction to Medical Engineering (3)

Eighth Semester

EE 114: Linear Active Networks (3)
EE 122: Pulse and Waveshaping Electronic Design (3)
EE 144: Elements of Communication Engineering II (3)
EE 160: Electrical Measurements (3)
EE 162: Electrical Engineering Laboratory (2)
EE 172: Control Systems (3)

Computer Science

Computer science is a new and developing discipline which combines the electronic design and mathematical utilization of computers into a single comprehensive area. The student who completes this option will be able to design both the hardware and software needed for large-scale computing systems. The curriculum prepares the student for graduate school or for a career in computing design and applications.

First Semester

Ap S 1: Engineering in Modern Society (1)
Engl 1 or 1x: English Composition (3)
Math 30: Precalculus (3)
Phys 1: General Physics (4)
Elective: Selected from humanities or social sciences (3)

Second Semester

Ap S 2: Engineering in Modern Society (1)
EE 51: Applications of Computers (3)
Math 31: Calculus of One Variable (3)
Phys 2: Introduction to Modern Physics (4)
Elective: Selected from humanities or social sciences (3)

Third Semester

Chem 13: General Chemistry (4)
E Ad 115: Probabilistic and Statistical Methods in Engineering (3)
Math 32: Calculus of Several Variables (3)
Phys 31: Introduction to Theoretical Physics (2)
Phys 51: Introduction to Experimental Physics (2)
Elective: Selected from humanities or social sciences (3)

Fourth Semester

Ap S 59: Introductory Analytical Mechanics (4)
Ap S 113: Engineering Analysis I (3)
CE 140: Materials Science (3)
Phys 32: Introduction to Theoretical Physics (2)
Phys 52: Introduction to Experimental Physics (2)
Elective: Selected from humanities or social sciences (3)

Fifth Semester

Ap S 114: Engineering Analysis II (3)
EE 11: Linear Networks I (3)
EE 31: Fields and Waves I (3)
EE 60: Introductory Electrical Engineering Laboratory I (2)

ME 131: Thermodynamics (3)
Elective: Selected from humanities or social sciences (3)

Sixth Semester

EE 12: Linear Networks II (3)
EE 20: Introductory Engineering Electronics (3)
EE 32: Fields and Waves II (3)
EE 61: Introductory Electrical Engineering Laboratory II (2)
EE 152: Introduction to Digital Computers (3)
Elective: Selected from humanities or social sciences (3)

Seventh Semester

EE 113: Network Analysis and Design (3)
EE 121: Engineering Electronics and Design (3)
EE 153: Design of Switching Systems (3)
EE 155: Introduction to Numerical Methods (3)
EE 157: Machine and Assembly Language Programming (3)
EE 161: Electrical Engineering Laboratory (2)

Eighth Semester

EE 122: Pulse and Waveshaping Electronic Design (3)
EE 154: Digital Computer Design (3)
EE 156: Introduction to System Programming (3)
EE 158: Algorithmic Methods and High-level Languages (3)
EE 162: Electrical Engineering Laboratory (2)
EE 172: Control Systems (3)

COURSES

11 Linear Networks I (3)

Circuit concepts, elements, and parameters; network conventions and equations: mesh and node analysis; network solutions using differential equations and initial conditions; transient and steady-state response; impedance concepts; energy and power; resonance. Prerequisite: Ap S 113, Phys 32. (Fall—day and evening)

12 Linear Networks II (3)

Singular functions; Laplace transform; network functions, poles and zeros, total response; time and frequency domains; convolution theorems; Fourier analysis, spectra; frequency response, Bode plots; two-port parameters. Prerequisite: Ap S 114, EE 11. (Offered every year: spring—day 1972–73 and alternate years: spring—evening)

20 Introductory Engineering Electronics (3)

Various types of devices used in electronic engineering considered from the point of view of the physics of their operation and from the engineering point of view of their application to electronic circuits. Solid-state, vacuum, and gaseous devices. Primary emphasis on application of these elements in power supplies and in linear amplifiers. Introduction of design concepts through use of graphical techniques. Prerequisite: EE 11. (Spring—day and evening)

31 Fields and Waves I (3)

Vector calculus, orthogonal coordinates, Coulomb's and Gauss' law, scalar potential, dipoles, method of images, Laplace's and Poisson's equations

boundary value problems. Prerequisite: Phys 32. Prerequisite or concurrent registration: Ap S 114. (Offered every year: fall—day; 1972–73 and alternate years: fall—evening)

32 Fields and Waves II (3)

Biot-Savart law, Ampere's law, vector potential, magnets, polarization and polarization currents, Faraday's law, Maxwell's equations, plane waves, and Poynting vector. Prerequisite: EE 31. (Offered every year: spring—day; 1972–73 and alternate years: spring—evening)

51 Applications of Computers (3)

Solution of problems on digital computers, using machine language, FORTRAN, data processing, and numerical methods. Writing, debugging, and running programs on a digital computer. (Fall—day and evening)

60 Introductory Electrical Engineering Laboratory I (2)

Use, theory of design, and application of standard electronic laboratory equipment; applications of instrumentation through experiments in basic network theorems; measurement of electrical quantities and characteristics of electrical devices. Prerequisite or concurrent registration: EE 11, 31. (Offered every year: fall—day; 1971–72 and alternate years: fall—evening)

61 Introductory Electrical Engineering Laboratory II (2)

Characteristics of electronic devices and circuits; design of electronic amplifiers and measurement of their properties; experiments in support of courses in networks, fields, and electronics. Prerequisite or concurrent registration: EE 12, 20, 60. (Offered every year: spring—day; 1971–72 and alternate years: spring—evening)

113 Network Analysis and Design (3)

Application of matrices and linear graphs to electrical networks; trees, circuits, cut-sets; network equations; signal-flow graphs; introduction to state-space techniques; computer solutions; network transfer functions; properties and synthesis of two-element, one-port networks; filter theory and design; computer-aided circuit design. Prerequisite: EE 12, 20. (Offered every year: fall—day; 1972–73 and alternate years: fall—evening)

114 Linear Active Networks (3)

Description of networks by terminal and port concepts; power and scattering parameters; analysis of active networks, including negative impedance converters, gyrators, etc.; interconnection of networks; properties of active networks, including reciprocity, stability, activity, and feedback. Prerequisite: EE 113. May be taken for graduate credit. (Spring—day and evening)

121 Engineering Electronics and Design (3)

Graphical analysis and design beyond the level covered in Electrical Engineering 20. Introduction of incremental analysis and design methods to electronic circuits; use of equivalent circuits; amplifiers, oscillators, modulation, and demodulation. Prerequisite: EE 20. (Offered every year: fall—day; 1972–73 and alternate years: fall—evening)

122 Pulse and Waveshaping Electronic Design (3)

Introduction to and design of the type of nonlinear circuits used in mod-
ern-day computer and communications systems. Pulse, sweep, switching
and logic circuits; counting and timing circuits. Prerequisite: EE 121
(Offered every year: spring—day; 1972–73 and alternate years: spring—
evening)

133 Electromagnetic Waves (3)

Time-harmonic Maxwell equations, complex Poynting vector, transmis-
sion lines, characteristics of common waveguides, resonant cavities, Smith
chart, Lorentz reciprocity, simple antennas, linear antenna arrays. Pre-
requisite: EE 32. (Fall—day and evening)

143 Elements of Communication Engineering I (3)

Fourier series and transforms; power spectra and correlation; principles
of modulation; amplitude, angle, and pulse modulation; modulation and
demodulation systems; time and frequency division multiplexing. Pre-
requisite or concurrent registration: EE 113, 121. (Offered every year:
fall—day; 1971–72 and alternate years: fall—evening)

144 Elements of Communication Engineering II (3)

Introduction to the statistical theory of communication, random signals
and noise, concepts of information theory, transmission of information
over noisy channels, comparison of modulation systems in the presence of
noise. Prerequisite: EE 143. (Offered every year: spring—day; 1971–
72 and alternate years: spring—evening)

152 Introduction to Digital Computers (3)

Introduction to the use and structure of digital computers, addressing
methods, data processing, and machine language programming; Boolean
algebra and introduction to the design of combinational switching circuits;
number systems and arithmetic in digital machines; machine subsystems
and their interconnections; use of software systems and software-hardware
relationships. Prerequisite: EE 51 or permission of instructor. (Offered
every year: spring—day; 1972–73 and alternate years: spring—evening)

153 Design of Switching Systems (3)

Switching algebra and Boolean logic; analysis and design of switching
devices; design of combinational and sequential logic networks; minimi-
zation techniques and their use in logic design; electronic implementation
of logic; number systems and codes, geometric interpretation, error-
correcting codes; encoding and decoding; logic and electronic design of
functional digital units. Prerequisite: EE 152 or permission of instruc-
tor. May be taken for graduate credit. (Fall—day and evening)

154 Digital Computer Design (3)

Logic and electronic design of functional digital units, design of com-
puter subsystems, flow of information and logical flow diagrams in timing
and control; design of memory, arithmetic, and I/O units; binary and
decimal machine arithmetic; design of a digital computer. Prerequisite or
concurrent registration: EE 153 or permission of instructor. May be taken
for graduate credit. (Spring—day and evening)

155 Introduction to Numerical Methods (3)

Use of numerical methods in engineering and scientific problems, concepts
of algorithm and flowcharts, errors in computer and numerical methods.
Introduction to numerical methods for the solution of simultaneous linear

algebraic equations, roots of equations, numerical differentiation, and integration; the solution of ordinary differential equations. Statistical methods for the evaluation of experimental data and correlation techniques. Prerequisite: EE 51 or equivalent. (Offered every year: fall—day; 1971–72 and alternate years: fall—evening)

156 Introduction to System Programming (3)

Introduction to computer software and software systems; management of computer software; concepts in the use of macro-assemblers, loaders, monitors, and executive systems; control of input-output and utility programs; recursive and reentrant programming for time-shared systems; introduction to multiprogramming and multiprocessor software systems. Prerequisite: EE 157 or permission of instructor. May be taken for graduate credit. (Offered every year: spring—day; 1971–72 and alternate years: spring—evening)

157 Machine and Assembly Language Programming (3)

Machine and assembly language programming in fixed and variable word-length computers; techniques in addressing and machine control; data structures and data processing; use of subroutine linkages; co-routines, pushdown lists, list processing, loops and input-output subroutines; use of a macro-assembly language; sorting, merging, arrays, and data fields in data processing. Prerequisite: EE 152 or equivalent, or permission of instructor. May be taken for graduate credit. (Fall—day and evening)

158 Algorithmic Methods and High-level Languages (3)

Introduction to high-level procedural and problem-oriented computer languages; data structures and choice of a data processing language. List processing, string processing, and introduction to information retrieval; large data bases and their use in time-shared systems; simulation languages; introduction to heuristic programming. Prerequisite: EE 51 or equivalent and permission of instructor. May be taken for graduate credit. (Spring—day and evening)

160 Electrical Measurements (3)

Electrical measurements, from direct current through radio frequencies; techniques; detectors; bridges; measurement of current, voltage, power, resistance, capacitance, inductance, energy, phase angle, frequency, and time; dielectric and magnetic measurements; topics in high-frequency measurement, including field strength, signal-to-noise ratio, impedance, attenuation. Prerequisite: EE 12, 20. (Spring—evening)

161–62 Electrical Engineering Laboratory (2–2)

Experiments in support of courses in networks, electronics, microwaves, computers, communications, controls, and machines. The student is required to begin a design project in the first half of the course; the completion of this project is the major effort of the second half. Prerequisite or concurrent registration: EE 61, 113, 121, 152. EE 161 is prerequisite to EE 162. (Offered every year: academic year—day; 1971–72 and alternate years: academic year—evening)

172 Control Systems (3)

Analysis and design of linear feedback control systems. Applications of stability criteria, steady-state and transient analyses. Prerequisite: EE 12, 20. (Offered every year: spring—day; 1972–73 and alternate years: spring—evening)

177 Electrical Energy Conversion (3)

Fundamentals of electromechanical energy conversion. Electromechanical transducers and their equivalent circuits, three-phase and single-phase a-c rotating machines, d-c machines, rotating machines as circuit elements. Prerequisite: EE 12. (Offered every year: fall—day; 1971-72 and alternate years: fall—evening)

184 Introduction to Medical Engineering (3)

Designed to introduce the engineering or physical sciences student to the applications of engineering in the medical sciences; terminology of the medical profession emphasized; the physiology of the human body presented from overall systems or functional approach; survey of present-day medical measurements and consideration of those areas in which engineering may be applied advantageously to medicine. May be taken for graduate credit. Admission by permission of instructor. (Fall—day and evening)

198 **Research** (1 to 3)

Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status. (Fall and spring)

GRADUATE STUDY

Electrical engineering, at the graduate level, provides one of the most stimulating experiences in advanced studies. The student has reached a degree of maturity and basic knowledge that allows him to enter into new avenues of exciting work. Courses prepare the student in areas of concentration such as networks, electronics, fields and waves, communications, computer sciences, controls and systems, and medical engineering. Depending upon the interest of the student, some of the programs leading to the degree of Master of Science are given at the NASA-Langley Research Center, Langley Station, Hampton, Virginia. NASA-Langley's extensive scientific and engineering facilities and equipment are utilized whenever feasible. Arrangements can also be made to use the facilities of the Naval Ship Research and Development Laboratory, Annapolis, Maryland, where an off-campus Master's degree pilot program has been initiated.

The graduate programs are formulated to take into consideration the student's individual strengths, potentials, skills, aspirations, and abilities. Determined through consultation by the student and his faculty adviser, their purpose is to provide the student with a thorough understanding of his area of concentration and at the same time to provide him with the breadth of knowledge necessary in modern engineering.

The graduate programs are, in addition, designed to provide a needed educational service to the Washington technical community. Many of the courses have been developed after consultation with private industry and government agencies of the area. They are offered during both the afternoon and evening with a principle of rotation from year to year.

The Department of Electrical Engineering and Computer Science has continuously kept the graduate program up to date, through constant contact with recent developments, through its own research, and through the addition of several experts in appropriate fields serving as part-time and adjunct faculty. The Department provides a well-balanced, modern graduate program.

In order to provide the student with detailed information about its graduate programs, from the point of view of procedures, requirements, regulations, and scope, the Department of Electrical Engineering and Computer Science publishes annually a detailed brochure to supplement the present catalogue. In addition, the Department publishes special pamphlets describing specific programs.

FIELDS AND AREAS OF CONCENTRATION

Networks

211–12 Advanced Network Analysis I, II
215–16 Linear Network Synthesis I, II
319 Networks Research

Electronics

221–22 Physical Electronics I, II
225 Nonlinear Electronics
226 Optical Electronics
227 Industrial Electronics
228 High-frequency Electronics
323 Principles of Microelectronics
325 Principles of Lasers
329 Electronics Research

Fields and Waves

230 Electromagnetic Theory
231 Field Analysis and Potential Theory
232 Electrodynamics
233 Microwaves and Components
234 Electromagnetic Wave Propagation
235 Antennas
236 Magnetohydrodynamics
339 Fields and Waves Research

Communications

241–42 Information Theory I, II
243–44 Communication Theory I, II
245 Signal Detection and Estimation Theory
246 Digital Communications
247 Communication Systems
248 Microwave Communication Systems
277 Space Communication Systems
349 Communications Research

Computer Science

250 Application of Numerical Methods
251 Computing Systems
252 Information Retrieval Systems
253 Finite State Machines
254 Finite Automata
255 Pattern Recognition, Graphics and Optical Processing
256 Analog and Hybrid Computers
257 Digital Computer Programming Systems
258 Design of Compilers and High-level Languages
259 Systems Programming
352 Advanced Computing Systems
354 Theory and Practice of Microprogramming
359 Computer Science Research

Controls and Systems

271 Automatic Control in State Space Setting
272 Digital Control Systems
273 Optimal Programming and Control
274 Nonlinear Control Systems
275 Stochastic Processes in Automatic Control
276 Cybernetics
278 Spacecraft Systems Design

Controls and Systems

371 Simulation Methods for System Analysis
372 Analysis and Control of Large Systems
379 Controls and Systems Research

Medical Engineering

281 Electronic Measurements in Medicine
282 Instrumentation in Medical Electronics
283–84 Introduction to Medicine for Engineers I, II
285 Engineering in Vocational Medicine and Rehabilitation
389 Medical Engineering Research

COURSES

201 Natural Modes and Transients in Electrical Systems (3)

Transient response and natural modes of electrical systems; techniques for analyzing systems with periodic and aperiodic inputs and outputs; sampling. (Fall and spring)

211 Advanced Network Analysis I (3)

Network theorems; network functions, relationship of parts of network functions; analytic properties. Fourier analysis, impulse response, convolution, numerical techniques for computer solution. Computer-aided design. Prerequisite: EE 113 or permission of instructor. (1971–72 and alternate years: fall—evening; 1972–73 and alternate years: fall—day)

212 Advanced Network Analysis II (3)

Applications of linear graphs to networks; topological analysis; formulation and solution of state-space equations; formulation for computer solution. Advanced network properties, realizability, causality, controllability, and observability concepts. Prerequisite: EE 211. (1971–72 and alternate years: spring—evening; 1972–73 and alternate years: spring—day)

215 Linear Network Synthesis I (3)

Properties and testing of positive real functions. Synthesis of LC, RL, RC one-port networks. Brune, Bott-Duffin, Miyata, Kuh, and Darlington synthesis techniques. Introduction to two-port ladder and lattice synthesis. Three-terminal RC network synthesis approximation in the frequency and time domains. Prerequisite: EE 113 or permission of instructor. (1971–72 and alternate years: fall—day; 1972–73 and alternate years: fall—evening)

216 Linear Network Synthesis II (3)

Advanced topics in passive one-port and two-port synthesis. Introduction to n-port synthesis. Active network synthesis using negative resistance, controlled sources, NIC, gyrator, operational amplifiers, and circulators. Synthesis of distributed integrated networks. Computer-aided network optimization. Prerequisite: EE 215. (1971–72 and alternate years: spring—day; 1972–73 and alternate years: spring—evening)

221 Physical Electronics I (3)

Theoretical principles underlying the operation of electronic devices; classical mechanics and classical statistical mechanics, the quantum theory, wave and matrix mechanics, quantum statistics. Prerequisite: graduate

status. (1971–72 and alternate years: fall—evening; 1972–73 and alternate years: fall—day)

222 **Physical Electronics II** (3)

The Boltzmann transport equation, band theory of solids, time-dependent perturbation theory, group theory. Applications to semiconductor and other solid-state devices such as transistors, tunnel diodes, masers, and lasers. Prerequisite: EE 221. (1971–72 and alternate years: spring—evening; 1972–73 and alternate years: spring—day)

225 **Nonlinear Electronics** (3)

Analysis and design of electronic components and systems operating as switching, sweeping, gating, and pulse generators; study of multivibrators, negative resistance devices and amplifiers, nonlinear operation of oscillators. Prerequisite: EE 122, 153; or equivalent. (1971–72 and alternate years: fall—day; 1972–73 and alternate years: fall—evening)

226 **Optical Electronics** (3)

Principles of optical systems, aberrations, and optical resonators; quantum theory of radiation, coherence and detection of radiation; lasers, holography, optical (spatial) filtering, and nonlinear optics. Prerequisite: EE 221 or equivalent. (1971–72 and alternate years: spring—day; 1972–73 and alternate years: spring—evening)

227 **Industrial Electronics** (3)

Applications of electronic devices in industry; continuous and sampled control systems; induction and dielectric heating; timing and counting circuits; reliability and automatic checking equipment; digital control of machine tools. Prerequisite: EE 122 or equivalent and graduate status. (Fall—evening)

228 **High-frequency Electronics** (3)

Design and analysis of the operation of electron-tube, solid-state, crossed-field, space-charge wave, and quantum maser oscillators and amplifying devices that lay the foundation of modern-day communication systems. Prerequisite: EE 133 or equivalent. (Spring—evening)

230 **Electromagnetic Theory** (3)

Brief review of Maxwell's equations, boundary conditions, electromagnetic potentials, Poynting's theorem, generalized orthogonal coordinates, field equivalence theorems; applications to problems involving reflection, refraction, scattering, and diffraction of electromagnetic waves. Prerequisite: EE 32. (Fall—evening)

231 **Field Analysis and Potential Theory** (3)

General study of the theory of potentials as used to facilitate solution of problems in electromagnetic theory, mechanics, thermodynamics, optics, and gravitation. Emphasis on mathematical methods such as Green's functions, variational methods, principal axis transformations, and multi-dimensional Fourier transforms. Prerequisite: Ap S 211; EE 133 or equivalent. (1971–72 and alternate years: fall—day; 1972–73 and alternate years: fall—evening)

232 **Electrodynamics** (3)

Special theory of relativity and the Lorentz transformation; Minkowski formulation. Maxwell's equation in the context of special relativity, elec-

tromagnetic potentials, and stress tensors. Lagrangian and Hamiltonian formulation, radiation from moving charges. Introduction to quantum electrodynamics. Prerequisite: Ap S 211; EE 133 or equivalent. (1971–72 and alternate years: spring—day; 1972–73 and alternate years: spring—evening)

233 Microwaves and Components (3)

High-frequency transmission lines and guided systems; matching techniques; scatter ferrite isolators, gyrators; Faraday rotation: microwave networks; directional couplers; cavity resonators and microwave components. Prerequisite: EE 133 or equivalent. (Fall—evening)

234 Electromagnetic Wave Propagation (3)

Retarded time scalar, vector, and Hertz potential. Dipole and dipole array fields; Mie theory of electromagnetic scattering by spheres. Propagation in electrically and magnetically anisotropic media such as dielectric crystals, space-charge plasmas, and ferrites. Wave propagation in inhomogeneous media; Liouville transformation, Lagrange's variation of parameters, WKB solution, invariant imbedding techniques. Propagation in stochastic and dispersive media. Prerequisite: EE 133 or equivalent. (1971–72 and alternate years: spring—evening; 1972–73 and alternate years: spring—day)

235 Antennas (3)

General solution of Maxwell's equations in terms of current sources, the far field approximations, radiation from current distributions, field equivalence theorems, the geometrical optics approximation, aperture antennas, receiving antennas, the theory of arrays, and applications to specific antennas and antenna types. Prerequisite: EE 133 or equivalent. (1971–72 and alternate years: fall—evening; 1972–73 and alternate years: fall—day)

236 Magnetohydrodynamics (3)

(Formerly EE 230)

Study of the interaction of fluids with electromagnetic fields. Generalized Navier-Stokes and energy equations, magnetogasdynamic and magnetohydrodynamic approximations, boundary layer theory, statistical theory of turbulence, generalized Von Karman-Howarth equation, Boltzmann transport equation. MHD generators and devices. Prerequisite: EE 133 or equivalent. (Spring—evening)

241 Information Theory I (3)

Laws and theorems of probability, statistical measure of uncertainty and information; noiseless coding, communication channels, channel capacity, fundamental theorems of information theory. (1971–72 and alternate years: fall—evening; 1972–73 and alternate years: fall—day)

242 Information Theory II (3)

Error-correcting codes, parity-check coding, information sources, channels with memory, Markov chains, continuous channels. Prerequisite: EE 241. (1971–72 and alternate years: spring—evening; 1972–73 and alternate years: spring—day)

243 Communication Theory I (3)

Probability, random processes, correlation functions, and power spectra. Output distributions of linear and nonlinear devices with random inputs. Optimum receiver principle, vector channels, optimum receivers for binary

and M-ary signals over white Gaussian channels and their error probabilities for different signal sets such as simplex and orthogonal signals. Prerequisite: EE 143. Prerequisite or concurrent registration: Ap S 211. (1971–72 and alternate years: fall—day; 1972–73 and alternate years: fall—evening)

244 **Communication Theory II** (3)

Schemes of efficient signaling for data sequences and their performance analysis. Channel models, filtering, and optimum modulation and demodulation. Signaling over fading channels and their optimum receivers. Diversity transmission and various reception schemes. Prerequisite: EE 243. (1971–72 and alternate years: spring—day; 1972–73 and alternate years: spring—evening)

245 **Signal Detection and Estimation Theory** (3)

Statistical detection theory, hypothesis testing, sequential detection, estimation theory, maximum likelihood and Bayes methods, estimation of signal parameters and continuous wave forms, Wiener and Kalman filters, applications to the design of optimum receivers, adaptive systems. Prerequisite: EE 241, 244; or equivalent. (Fall—evening)

246 **Digital Communications** (3)

Analog-to-digital conversion; the sampling theorem and its implications; applications of the Z-transform; optimum codes and optimum decoding schemes; generation of pseudorandom sequences; choice of optimum wave forms; decision theory and optimum detection schemes; sampled data systems; digital communication systems. Prerequisite: EE 241, 244; or equivalent. (Spring—evening)

247 **Communication Systems** (3)

Wiener filters, phase-locked loops and their optimization. Parameter estimation theory with application to optimum demodulation of analog wave forms (DSB-AM, SSB-AM, FM). Comparative analysis of analog modulation systems. Digital communication systems—coherent and noncoherent reception of binary and M-ary signals and their performance analysis. Frequency acquisition and synchronization. Prerequisite: EE 243. (Fall—evening)

248 **Microwave Communication Systems** (3)

Analysis and design of microwave communication systems with emphasis on radar, microwave relay, and satellite systems. Prerequisite: EE 133, 143; or equivalent. (Spring—evening)

250 **Application of Numerical Methods** (3)

Numerical methods in scientific and engineering problems; development of computer algorithms for the solution of numerical problems; error analysis and sensitivities of numerical methods; use of a procedural computer language in the solution of numerical methods; computer methods for simultaneous equations, interpolation, differentiation and quadrature, solution of ordinary differential equations, boundary value problems, partial differential equations, and linear algebra. Prerequisite: EE 51 or equivalent and permission of instructor. (Spring—evening)

251 **Computing Systems** (3)

Organization of large digital computer systems. Design of high-speed arithmetic units. Random access and associative memories; rotational storage devices; computer control and interrupt structures. Input-output

channels and interfacing problems. Communications in digital computer... Introduction to multiple access and time-sharing systems. Prerequisite: EE 154. (1971–72 and alternate years: fall—day; 1972–73 and alternate years: fall—evening)

252 Information Retrieval Systems (3)

Information organization and retrieval of natural language data by digital computer systems; statistical, syntactic, and logical analysis of natural language used for retrieval systems; dictionary systems including thesaurus look-up and phrase structures; searching strategies and cataloguing. Input preparation and output structures; large-scale file structures and operating systems required for their use. Prerequisite: EE 157 or equivalent. (Spring—evening)

253 Finite State Machines (3)

Analysis and design of sequential networks, state diagrams, flow tables, equivalence of states, races, transition maps, output tables, hazards, synchronous and asynchronous sequential networks. State assignment problem, partitions, partition pairs, information flow inequalities, clocked state realizations, parallel and serial decompositions, machine networks and decompositions. State identification. Prerequisite: EE 153. (Fall—evening)

254 Finite Automata (3)

Effectively computable functions, recursive functions, regular expressions, single and multiple tape Turing machines, probablistic automata, neural nets, reliability of automata, artificial intelligence, learning machines, threshold logic, adaptability, pushdown automata. Prerequisite: EE 253. (Spring—evening)

255 Pattern Recognition, Graphics and Optical Processing (3)

Graphical data processing and display systems; software systems needed for graphical I/O; digital and analog display methods; scanning, sampling, digitizing, and transmission of data; holography, optical memories and systems; storage techniques and processing of images; concept analysis, linear and area transforms; geometry, topology, and syntax of pictures; picture enhancement; resolution analysis; signal-to-noise problems; transformations, projections, and the hidden-line problems. Prerequisite: EE 157 or equivalent and permission of instructor. (Fall—evening)

256 Analog and Hybrid Computers (3)

Analog computer components and electronics. Slow analog computer solutions of linear and nonlinear differential equations. System simulation and modeling on the analog computer. Introduction to the iterative analog computer. Transfer function simulation and use in control theory. The hybrid computer, digital logic and digital computer control. Digital-to-analog and analog-to-digital converters and interfaces. Optimization methods on a hybrid computer. Parameter variations and searching methods. Prerequisite or concurrent registration: EE 154 or permission of instructor. (1971–72 and alternate years: spring—day; 1972–73 and alternate years: spring—evening)

257 Digital Computer Programming Systems (3)

Introduction to the design of computer software and software systems. Design of assemblers and monitor systems. Communication between components of systems. Design of loaders, input-output control systems and utility systems. Prerequisite: EE 157 or permission of instructor.

(1971–72 and alternate years: fall—evening; 1972–73 and alternate years: fall—day)

258 **Design of Compilers and High-level Languages** (3)

Design of high-level, problem-oriented languages. Grammar, syntax, semantics, and pragmatics as they affect the design of translators and compilers. Context-free languages, pushdown lists, polish-string notation, and addition programming methods used in the construction of compilers and translators. Prerequisite: EE 257 or permission of instructor. (1971–72 and alternate years: spring—evening; 1972–73 and alternate years: spring—day)

259 **Systems Programming** (3)

Batch processing software systems and their limitations; multiprogramming in fixed and variable partitions; data bases and table-driven software; use of list processing in systems programming; multiprocessor systems and fail-soft systems; I/O processing for remote batch and on-line time-sharing systems; introduction to the computer as a utility; real-time programming in a multiprogram environment; system subprograms as reentrant and recursive code. Prerequisite: EE 257 or equivalent. (Fall—evening)

271 **Automatic Control in State Space Setting** (3)

State space formulation of continuous systems, simulation diagrams, transfer function matrices, matrix representation of state equations, controllability and observability, the state transition matrix, stability analysis, methods of Liapunov. Prerequisite: EE 172 or permission of instructor. (1971–72 and alternate years: fall—evening; 1972–73 and alternate years: fall—day)

272 **Digital Control Systems** (3)

Sampling processes and theorems; stability criteria, Z-transforms, modified Z-transforms, and responses of sampled-data systems; state variables for discrete systems; examples of practical digital computer control systems; synthesis and design of sampled-data control systems; nonlinear sampled-data control systems. Prerequisite: EE 271 or equivalent. (1971–72 and alternate years: spring—evening; 1972–73 and alternate years: spring—day)

273 **Optimal Programming and Control** (3)

Optimization theory. Calculus of variations; Euler's equation, fixed and variable endpoint conditions, boundary value problem, equality constraints, and Lagrange multipliers. Performance indices and penalty functions. The maximum principle and the Hamilton-Jacobi equation. Properties of optimal systems. Functional equations techniques of dynamic programming. Prerequisite: EE 271 or equivalent. (1971–72 and alternate years: fall—day; 1972–73 and alternate years: fall—evening)

274 **Nonlinear Control Systems** (3)

Definition of linear and nonlinear systems. Phase portraits and limit cycles. First-order approximation or describing functions; Tsypkin's locus. Lipschitz's conditions; method of Krylov and Bogolinbov. Stability criteria: Liapunov's, Popov's, and Lur's methods. Nonlinear systems with time-varying parameters; switching systems; nonlinear programming optimization. Prerequisite: EE 273. (1971–72 and alternate years: spring—day; 1972–73 and alternate years: spring—evening)

275 Stochastic Processes in Automatic Control (3)

Analysis of effects of time-invariant linear control systems on stationary random processes. The optimal filtering problem based on the maximum principle. Iterative parameter estimation using matrix inversion lemma. Analysis and control of multivariable systems in the presence of various disturbances. Stochastic stability. Statistical analysis of nonlinear systems—stationary and nonstationary states. Prerequisite: EE 271 or equivalent. (Fall—evening)

276 Cybernetics (3)

Principles of machines or mechanisms made by men or nature with regard to their ways and forms of possible behaviors: regular, determinate, or reproducible; fundamental concepts of finite differences; changes and transformations as sets of transitions, leading to stability and feedback; statistical concepts of complex systems and blackbox theory; Shannon's information theory; regulation and control of mechanisms. Prerequisite: graduate status and E Ad 115 or equivalent. (Spring—evening)

277 Space Communication Systems (3)

Theoretical and application aspects of space communications, as related to communication satellite systems, scientific satellites, manned space missions, and deep space missions. Prerequisite: graduate status. (Fall—evening)

278 Spacecraft Systems Design (3)

Space environment; structure, propulsion, control, and instrumentation of spacecraft—launch, orbit, transit, and re-entry problems; bioastronautics considerations. Prerequisite: graduate status. (Spring—evening)

281 Electronic Measurements in Medicine (3)

Theory of measurements in biological areas, techniques for electronic measurements on biological specimens, current problems in medical instrumentology stressing electronic systems. Prerequisite: EE 284 or permission of instructor. (Fall—evening)

282 Instrumentation in Medical Electronics (3)

Medical telemetry systems, medical use of the computer, engineering techniques in patient treatment, principles of good medical instrumentation. Prerequisite: EE 284 or permission of instructor. (Spring—evening)

283 Introduction to Medicine for Engineers I (3)

Designed to acquaint the engineering student with the physiology of the human body; material based on the curriculum of the School of Medicine and taught from a systems viewpoint; concepts of cellular structure and function integrated into the tissue and organs, which are then related to the various systems of the body; interrelationships of the body systems, i.e., the interaction of the nervous system with the musculoskeletal system or the interaction of the respiratory system and its functions with the cardiovascular system. Prerequisite: EE 184 or equivalent. (Fall—evening)

284 Introduction to Medicine for Engineers II (3)

Clinical aspects of medicine. Further elaboration of physiological systems, such as the endocrine system, renal physiology, gastrointestinal physiology, and others; the separate systems of the body are integrated to present the functioning of the body as an overall system; considerable inte

action with physicians and other medical personnel. Prerequisite: EE 283. (Spring—evening)

285 **Engineering in Vocational Medicine and Rehabilitation** (3)
Application of engineering theory and techniques to the rehabilitation of handicapped persons; major problem areas and general approaches, as well as specific solutions. Offered cooperatively with personnel from the Social and Rehabilitation Services Administration. Prerequisite: EE 284. (Spring—evening)

298 **Research** (arr.)
Research as arranged. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3)
(Fall and spring)

319 **Networks Research** (arr.)
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

323 **Principles of Microelectronics** (3)
Vacuum techniques; thin film deposition and components; masking; thin film active devices. Thick films and hybrid circuits. Properties of semiconductors; solid state chemistry. Junction formation; epitaxy, masking, and device formation. Prerequisite: EE 222 or equivalent. (Fall—evening)

325 **Principles of Lasers** (3)
Basic concepts from quantum mechanics; Einstein coefficients; inversion and pumping mechanisms; laser rate equations. Resonators, He-Ne laser; organic dye lasers; injection lasers. Nonlinear interactions in lasers. Prerequisite: EE 226 or equivalent. (Fall—evening)

329 **Electronics Research** (arr.)
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

339 **Fields and Waves Research** (arr.)
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

349 **Communications Research** (arr.)
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

352 **Advanced Computing Systems** (3)
Multiple access computer systems, multi-programming, multi-processing, and time-sharing. Real-time computation; man-machine communication problems, and remote I/O devices. Memory allocation and protection. Secondary storage organization and retrieval. Effects of storage on program operation. Design of file structures. Analytical time-sharing models, scheduling schemes, and user response time. Prerequisite: EE 251. (Spring—evening)

354 **Theory and Practice of Microprogramming** (3)
Basic concepts, techniques, and theory of microprogramming as applied to the implementation of control systems for sequential machines. Micro-

program languages, assemblers, and hardware simulators, including spe
cific applications of these to the design of current computer systems an
their interfaces with real-time systems. Prerequisite: EE 154, 157; 257 o
equivalent. (Spring—evening)

359 **Computer Science Research** (arr.)

Limited to students preparing for the Doctor of Science qualifying exam
nation. May be repeated for credit. (Fall and spring)

371 **Simulation Methods for System Analysis** (3)

Survey of simulation languages. Techniques of model building for mate
rial- and machine-based systems. Treatment of these systems with notio
of transactions and states. Modeling the dynamic processes of growt
problems. Analog, hybrid, and digital methods for simulation treated b
means of case studies; speed and cost of alternate computing procedures.
Project-type problems used to illustrate simulation methods. Prerequisite
EE 256 or permission of instructor. (Fall—evening)

372 **Analysis and Control of Large Systems** (3)

Systems as multistage decision processes. Analytical concepts of mode
making and matrix representation for computer mechanization. Recursiv
digital computer algorithm for economy in storage and computing time
System identification. Adaptive control systems. Prerequisite: EE 25
or equivalent. (Spring—evening)

379 **Controls and Systems Research** (arr.)

Limited to students preparing for the Doctor of Science qualifying exam
nation. May be repeated for credit. (Fall and spring)

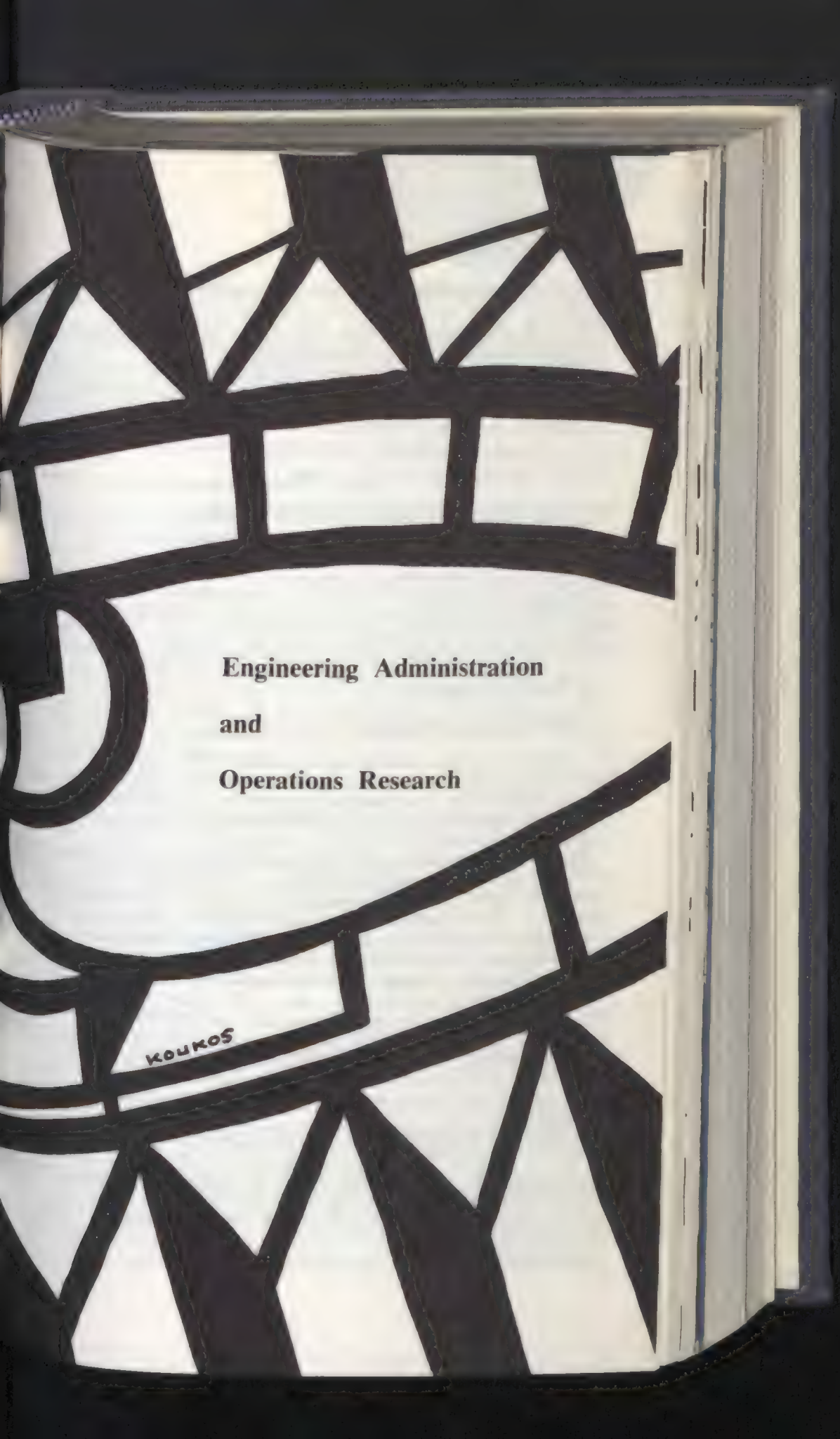
389 **Medical Engineering Research** (arr.)

Limited to students preparing for the Doctor of Science qualifying exam
nation. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.)

Limited to Doctor of Science candidates. May be repeated for credit.
(Fall and spring)




Engineering Administration
and
Operations Research
KOUKOS

Engineering Administration and Operations Research*

Professors P.A. Crafton, H.E. Smith, P.S. Shane, John Kaye, Kenneth Johnson, W.H. Marlow *(Chairman)*, Rosedith Sitgreaves *(Visiting)*
Associate Professors Donald Gross, N.D. Singpurwalla, C.M. Harris *(Visiting)*
Associate Professorial Lecturers L.S. Rotolo, Victor Selman, J.E. Falk, R.W. Bublitz, D.H. Jermain, F.A. Miercort, Charles Anello, A.J. Truelove, John Waller
Assistant Professors J.B. Smith, Jr., C.E. Pinkus
Assistant Professorial Lecturer P.D. Robers

GRADUATE FIELDS AND AREAS OF CONCENTRATION

Engineering Administration **Systems Analysis**
Operations Research

Programs in Engineering Administration lead to the degrees of Master of Engineering Administration and Doctor of Science. Programs in Operations Research lead to the degrees of Master of Science and Doctor of Science. The program in Systems Analysis leads to the degree of Master of Science.

THE MASTER'S PROGRAMS

ENGINEERING ADMINISTRATION

The principal objective of the program leading to the degree of Master of Engineering Administration is to prepare students whose undergraduate background training was in engineering, mathematics, or physical sciences for positions of major managerial responsibility in American industry, government, or the armed services.

The program is designed to help the student achieve a broad understanding of the administrative process. Although years of experience are required to develop the skills, insight, and maturity of judgment which distinguish an effective manager in technical and scientific enterprises, a graduate professional management curriculum can give the student an effective start as a manager. The curriculum provides an opportunity for the student to gain an understanding and to develop some useful managerial skills in the functional areas of engineering administration. One of the major purposes is to assist the student in forming the habit of examining problems from an over-all administrative point of view. The individual's own particular experience, and the explicit process of relating this experience to the theoretical structure which he starts to build in graduate study, provides each student with a personal frame of reference through which he may interpret management in a rapidly changing world.

Successful education for engineering administration implies a clear statement of what it is that an engineering manager must do, an analysis of the broad functions involved in management, and a final detailing of modern quantitative methods useful in making and executing decisions. It is the aim of the School, therefore, to keep alive a spirit of general inquiry and a problem-solving orientation.

* Staff of instruction for the academic year 1970–71.

The management of technical enterprise is probably the most difficult challenge of our times. The professional engineering manager today must understand not only the currently developing technologies but also the rapidly changing market place where these technologies are applied for society's benefit. The engineering administrator is the link between these dynamic technologies and the needs of society in general.

In summary, the program of study has for its objective an educational experience which will contribute to the development of managers possessing a combination of technical know-how and administrative skill.

ADMISSION TO ENGINEERING ADMINISTRATION

In addition to the requirements for admission to graduate study (see pages 22–23), the applicant must have an adequate knowledge of the principles of human relations, the fundamentals of accounting, and the fundamentals of statistics. This requirement can be met by satisfactory completion of the following undergraduate courses or approved equivalents: Acct 115, *Survey of Accounting;* E Ad 115, *Probabilistic and Statistical Methods in Engineering;* and Psyc 145, *Psychology of Management.* A student is required to earn the grade of *C* or better (unless the requirement is stipulated to be a grade of *B* or better upon his admission) in each undergraduate prerequisite course. If this scholarship requirement is not met the student is barred from further enrollment. A student is not permitted to repeat any of the undergraduate prerequisite courses. Credit for prerequisite courses is not applicable toward the degree of Master of Engineering Administration.

REQUIRED COURSES

Analysis, case study, and quantitative approaches are emphasized in addition to technical theories of administration. A program of study consisting of an integrated sequence of courses is prescribed for each student in conference with an adviser. Students are required to complete E Ad 211–12, 269, 270, and 299–300; the remainder of the program is elective. E Ad 211–12, 269, and 270 must be taken prior to the elective courses, except that in certain cases permission may be obtained for concurrent registration. Students who wish to take courses in operations research beyond E Ad 269 and 270 should take E Ad 273 prior to or concurrently with other operations research courses.

OPERATIONS RESEARCH

The program in Operations Research leading to the degree of Master of Science is administered by the Department of Engineering Administration and Operations Research.

The objective of the program in Operations Research is to prepare students whose undergraduate background training was in engineering, mathematics, or physical sciences for study in depth of analytically-oriented techniques of management decision-making and applications.

Expanded scientific, statistical, and mathematical knowledge, combined with growing needs in technical as well as social areas, have created increased demands for individuals trained in the discipline of operations analysis.

The discipline of operations research uses scientific principles supported by statistical and mathematical methodology to study the function and structure

of complex technical industrial, military, and social systems in an effort to evaluate the probable effects of proposed courses of action, to establish criteria to judge the effectiveness of these courses, and to assist managers in making decisions to maximize financial return or minimize costs. The program in operations research provides a scientific basis for solving problems involving the interaction of many factors, organizational components in the interests of the whole or total problem. This breadth of interest is an example of the "systems approach" in the sense that a system is an interconnected complex of functionally related components. Most operations research problems begin with aspects of the general problem, with parts of restricted scope. This does not mean that operations research is not concerned with the system as a whole. Just as the industrial, mechanical, electrical, or chemical engineer may start with the study of subsystems or components of a general problem, so does the operations researcher.

ADMISSION TO OPERATIONS RESEARCH PROGRAM

In addition to the requirements for admission to graduate study (see pages 22–23), the applicant must have an adequate knowledge of statistics. This requirement can be met by satisfactory completion of the following undergraduate courses or approved equivalents: E Ad 115, *Probabilistic and Statistical Methods in Engineering;* Stat 191, *Probabilistic Methods for Operations Research;* and Stat 192, *Statistical Methods for Operations Research.* A student is required to earn the grade of *C* or better (unless the requirement is stipulated to be a grade of *B* or better upon his admission) in each undergraduate prerequisite course. If this scholarship requirement is not met, the student is barred from further enrollment. A student is not permitted to repeat any of the undergraduate prerequisite courses. Credit for prerequisite courses is not applicable toward the degree of Master of Science in the field of Operations Research.

REQUIRED COURSES

Required courses for the degree of Master of Science in the field of Operations Research are E Ad 269, 270, 272, 273, 274, 280, and 299–300. Students must complete E Ad 269, 270, and 273 before attempting any other courses; however, in certain cases, permission may be granted for concurrent registration. Students normally register for and complete E Ad 272 in the last semester of the program.

SYSTEMS ANALYSIS

The program in Systems Analysis leading to the degree of Master of Science is administered by the Department of Engineering Administration and Operations Research.

The objective of this program is to prepare students whose undergraduate background training was in engineering, mathematics, or physical sciences for responsible positions in the practice of systems analysis.

ADMISSION TO SYSTEMS ANALYSIS PROGRAM

The applicant must satisfy the requirements for admission to the Master's program in either Engineering Administration or Operations Research, as appropriate to the program of the individual student.

REQUIRED COURSES

Required courses for the degree of Master of Science in the field of Systems Analysis are E Ad 281, 282, 283, 284, and 299–300; the remainder of the program is selected from courses in the Department of Engineering Administration and Operations Research and the Department of Electrical Engineering and Computer Science, as appropriate to the program of the individual student.

DOCTORAL STUDY

Programs in Engineering Administration and Operations Research leading to the degree of Doctor of Science provide advanced study and research to enable gifted students to extend their fields of knowledge and to enhance their career opportunities in research analysis, management, administration, or education.

ADMISSION TO DOCTORAL STUDY

In addition to the general requirements for admission to doctoral study (see page 26), applicants must have a Master's degree, with a superior record of academic achievements, in engineering, physical science, or mathematics. Outstanding professional performance is also considered in evaluating applicants.

PROGRAMS OF STUDY

Major fields leading to the degree of Doctor of Science are available in both Engineering Administration and Operations Research. In addition to the major field, two minor areas of concentration are normally required, which may be chosen from the three areas administered by this Department—Engineering Administration, Operations Research, or Systems Analysis—or from appropriate areas available in other departments of the University, such as Economics, Statistics, or Urban and Regional Planning.

COURSES

UNDERGRADUATE

115 Probabilistic and Statistical Methods in Engineering (3)

Solution of engineering problems using sets and functions; probability models; distributions and functions; statistical concepts and methods, including hypothesis testing, correlation, and regression. Prerequisite: Math 32. (Fall and spring)

GRADUATE

204 Administration of Engineering Contracts (3)

Study of the total contracting process, including initial budget preparation and justification, actions leading to the execution of a contract, and administration of the contract to completion; considered from the viewpoints of the industrial and government buyer and the seller of technical materials and services. (Fall and spring)

207 Personnel Administration (3)

Study of the functions of managing personnel, with emphasis on relationships within organizations which utilize the services of engineers and scientists; employment, management, development, wages and classification, union relations, safety, health and collateral benefits and services, human relations, personnel research in the field. (Fall and spring)

210 Engineering Law (3)

Legal principles and procedures of interest to engineers, the American Legal System, contracts and specifications, liability of professional engineers, antitrust problems, agency relationships, negotiable instruments, patent and proprietary rights, special problems in research and development contracts. (Fall and spring)

211–12 Engineering Administration (3–3)

Comprehensive and systematic study of the administrative process with emphasis on industrial, scientific, and engineering environments. Planning: objectives, prediction, policies, plans and characteristics of plans. Organizing: theory of organization, structure, authority, specialization, delegation, staff and committees. Directing: leadership, managing human and material resources. Controlling: setting standards, evaluating performance, using system feedback data for correction and improvement. (Academic year)

213 Case Analysis in Engineering Administration (3)

Written analysis and class discussion of cases involving application of the principles of engineering administration and use of the scientific method. (1972–73 and alternate years: fall)

253 Production Management (3)

Planning, organizing, and control of production; forecasting techniques; material management; methods of loading and scheduling production processes; electronic methods in production control. Organization and administration of the plant engineering function with emphasis on maintenance control programs. Prerequisite: E Ad 269, 270; or permission of instructor. (Spring)

254 Automatic Data Processing Systems (3)

Logic of computers, arithmetic and control units, systems analysis for data processing applications, systems design, systems economics, relation to scientific decision processes. (Fall and spring)

255 Administration of Research and Development (3)

Study of contemporary practices of administrators of scientific and engineering research and development; the relation of these studies to accepted managerial concepts, and their effect on contemporary management hierarchies and organizational structures. (Fall and spring)

261 Economic Analysis in Engineering Planning (3)

Important concepts and theories employed in economic analysis of engineering projects. Application of various analytical processes. Detailed practice in pursuit of solutions to, and adjustment of, persistent and recurrent problems in this field. Prerequisite: E Ad 269 or permission of instructor. (Fall and spring)

269 Elements of Decision Making and Problem Solving (3)

History and orientation of operations research; concept of quantitative decision making; decision criteria under certainty, risk, and uncertainty; game theory; utility; the time factor; replacement models. Prerequisite: E Ad 115 or equivalent. (Fall and spring)

270 Survey of Operations Research Methods I (3)

Basic concepts and techniques of operations research as applied to problems in industrial, governmental, and military decision making. Simulation, Monte Carlo techniques; allocation models including the simplex procedure of linear programming, transportation and assignment models, queuing theory, inventory theory. Prerequisite: E Ad 115 or equivalent. (Fall and spring)

272 Problems in Operations Research (3)

Field experience in operations research on a team basis. Each small group locates an actual problem and formulates solution by operations research models. Class evaluation of progress. (Spring)

273 Mathematics for Operations Research I (3)

Matrix algebra, geometry of spaces, vector spaces, linear transformations and rank, simultaneous linear equations, convex sets, eigenvalue problems; solutions of linear ordinary differential equations, and differential difference equations. (Fall)

274 Mathematics for Operations Research II (3)

Elements of set theory, sequences and series, limits and continuity, differentiation, classical optimization techniques; integration, sequences and series of functions, functions of several variables; complex analysis, including analytic functions, contour integration, conformal mapping, and Fourier transforms. Prerequisite: E Ad 273 or permission of instructor. (Spring)

275 Linear Programming (3)

Basic computational, theoretical, and applied areas with emphasis on the general linear programming problems; simplex procedures; duality problems; parametric linear programming and sensitivity analysis, transportation problem. Prerequisite: E Ad 270, 273; or permission of instructor. (Fall and spring)

276 Theory of Games (3)

Study of mathematical models with applications to the relationships among independent competitive entities (persons or organizations in environment of competition, bargaining, bidding), selection of optimum strategies, minimax concept, connections with linear programming and decision functions, two-person and n-person zero and nonzero sum games. Prerequisite: E Ad 269 or permission of instructor. (Fall)

277 Queuing Theory (3)

Study and analysis of waiting line systems, birth and death processes, arrival and service patterns, single- and multi-channel systems, variations in queuing disciplines. Prerequisite: E Ad 270, 273, and Stat 191; or permission of instructor. (Spring)

278 **Nonlinear and Dynamic Programming** (3)

Static and dynamic optimization problems including convex, quadratic, and separable programs; network problems; problems in the calculus of variation. Gradient, Lagrangian, and penalty functions techniques. Prerequisite: E Ad 274, 275, 280; or permission of instructor. (Spring)

279 **Inventory Control** (3)

Application of mathematical techniques to decisions regarding when and how much to produce or purchase, control of production and inventory systems, various mathematical models of inventory systems with deterministic and stochastic demands, forecasting demand, interaction of production and inventory systems, simulation models. Prerequisite: E Ad 270, Stat 191; or permission of instructor. (Fall)

280 **Survey of Operations Research Methods II** (3)

Networks; integer programming; introduction to nonlinear programming; dynamic programming; Markov chains; reliability and replacement. Prerequisite: E Ad 270 or equivalent. (Spring)

281–82 **Systems Analysis and Management** (3–3)

Systems analysis as applied to management. Properties, nature, structure, and organization of systems; conceptualization of total system. Operational functioning and description of systems. Boundary and feedback concepts. Objectives of systems analysis, concept of planning, problem definition, choosing objectives for analysis. Relationship with other fields. Systems analysis as a methodology for exploring alternatives, assumptions, criteria, and risk. Decision making, measurement, and value theory in systems analysis. (Academic year)

283 **Systems Engineering I** (3)

Concept of system structure and organization. Linear and nonlinear systems analysis, simulation and modeling; statistical and gaming methods in systems analysis. Introduction to optimization methods and flow graph theorems. Prerequisite: E Ad 273 or permission of instructor. (Fall)

284 **Systems Engineering II** (3)

Design of systems, subsystems, and components. Dynamics and stability of systems; adaptive systems; system logic, tolerances, variations, and disturbances; signals and noise; system optimization. Prerequisite: E Ad 283. (Spring)

285 **Seminar: Administrative Problems** (3)

Individual analysis of complex administrative problems, with group evaluation and discussion. Prerequisite: 18 semester hours of graduate credit. (Fall and spring)

286 **Forecasting Techniques** (3)

Regression analysis and its use as a forecasting tool; uses and limitations of time series analysis in forecasting; business indicators and index numbers. Introduction to spectral theory; correlogram, periodogram, and spectral density. Prerequisite: E Ad 115 or equivalent. (1971–72 and alternate years: spring)

287 **Digital Systems Simulation** (3)

Monte Carlo techniques, random number and random deviate generation, variance reducing techniques; operational gaming; Monte Carlo applica-

tions in inventory, queuing, and production scheduling. Prerequisite: E Ad 115 or equivalent and knowledge of FORTRAN. (1972–73 and alternate years: spring)

293 **Technical Enterprises** (3)

Analysis of essential features of technology-based companies. Organization and launching of technical firms for whom the federal government is the principal customer. Planning the initial phases of operation, recruiting talent, financing and establishing a viable base. Case studies and a detailed plan for a venture. This course is designed for those within technical firms and those who depend on them as suppliers. (Fall)

294 **Marketing of Technology** (3)

Particular problems related to selling technical projects. Organization of the work and its performance, emphasis on marketing; proposal strategy, bidding reputation, competition, negotiation, the government's market. (Spring)

295 **Management of Technical Information** (3)

Needs and objectives of technical information systems, functions involved in technical information, storage and retrieval, abstracting, computer usage in technical information systems, system organization. (Spring)

296 **Reliability Theory I** (3)

(Former Reliability Engineering)

Review of estimation procedures, regularity conditions for maximum likelihood estimators, limit theorems, order statistics, and extreme value theory; probabilistic derivation of failure models from hazard-rate and renewal-theoretic considerations; topics in censored, truncated, and accelerated life tests for exponential and extremal types of distributions emphasizing linear and minimum-risk invariant estimators; sequential analysis and sequential life testing in both classical and Bayesian frameworks; nonparametric characterization of failure distributions and mathematical properties of failure-rate functions. Prerequisite: Stat 191, 192; or equivalent. (Fall)

297 **Problems in Engineering Administration** (3)

Guided experience in analyzing, solving, and reporting on field problems in engineering administration. Prior to registration, the student must have identified a suitable problem, not necessarily related to the Master's thesis topic, on which he will work. (Fall)

298 **Research** (arr.)

Basic or applied research in engineering administration. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3)

(Fall and spring)

376 **Games, Decisions, and Value Theory** (3)

General structure of statistical games: concepts of utility and optimal strategies, the invariance principle, sequential decision processes, Bayes procedures in games. Principles of value theory: measurement of relative values, metagames, and the dominance principle. Prerequisite: E Ad 276, Stat 192; or permission of instructor. (1972–73 and alternate years: spring)

377 Advanced Stochastic Models in Operations Research (3)

Selected topics in advanced queuing theory, including transient solutions, busy periods, and waiting times. Additional birth-death theory, imbedded Markov chains, fluctuation and renewal theory. Selected topics in advanced inventory theory, including conditions for optimality of (s, S) policies, stochastic lead-time problems, state-dependent lead times, multi-stage and multi-echelon problems. Prerequisite: E Ad 277, 279; or permission of instructor. (1972–73 and alternate years: fall)

378 Advanced Topics in Mathematical Programming (3)

Interger programming, branch-and-bound techniques, networks, linear programming under uncertainty. Prerequisite: E Ad 275, 278; or permission of instructor. (1971–72 and alternate years: fall)

386 Advanced Topics in Management (3)

Reading and discussion of classic and important recent literature concerning the philosophy and application of management principles. (Fall)

387 Technological Forecasting (3)

Concepts and methodology: normative and exploratory forecasting, resource allocation and forecasting, technology transfer, technological change and its effects on forecasting, technology assessment. (Spring)

388 Cost Effectiveness (3)

Concepts of evaluation of engineered systems, current methods and trends in methodology, system resource requirements, probability and decision theory in cost effectiveness studies, systems approach to cost effectiveness studies. (1972–73 and alternate years: fall)

396 Reliability Theory II (3)

Nonparametric methods in reliability: increasing failure rate (IFR) and decreasing failure rate (DFR) characterizations of failure distributions, tests for IFR, DFR, and "U-shaped" distributions. Coherent structures, classes of distributions preserved under coherent structures, bounds on system reliability using modular decomposition. Drenick's theorem, preservation of monotone failure rates. Replacement: comparison of random age, and block replacement policies. Repairman problems. Redundancy optimization and allocation of redundancy. Prerequisite: Stat 192 and permission of instructor. (1971–72 and alternate years: spring)

397 Advanced Topics in Operations Research (3)

Advanced topics from the literature of operations research for analysis, presentation, and discussion. Reading assignments from the professional journals selected by the instructor and the student. (Fall or spring)

398 Advanced Reading and Research (ARR.)

Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

399 Dissertation Research (arr.)

Limited to Doctor of Science candidates. May be repeated for credit. (Fall and spring)

Measurement Science*

Adjunct Professors L.A. Guildner, A.G. McNish, T.R. Young, F.K. Harris, D.P. Johnson
Professorial Lecturers Leon Horn, F.E. Washer

UNDERGRADUATE STUDY

Measurement science concerns the design, construction, and use of instruments in measurement, and the design of experiments. The curriculum prepares for such activities as testing of rockets, missiles, and space vehicles; measurements of the characteristics and properties of materials; determination of standards of measurement in light, heat, optics, electricity, etc.; measurement in various fields of science and in medicine; design and construction of measuring instruments; design and execution of experiments and tests of various kinds; and control of quality of manufactured products. The first four semesters are common to all undergraduate fields in the School.

The graduate will find many opportunities in space research, industry, manufacturing, and research. Opportunities are especially good in the design and application of instruments.

SUBJECT AREAS

General Measurement Science

101–2 Measurement Science

Instrumentation

111 Introductory Instrumentation
112 Instrumentation

Specific Measurements

121 Mechanical Measurement
122 Heat Measurement
123 Pressure Measurement

Laboratory

131 Measurement Laboratory
132 Measurement Projects Laboratory

CURRICULUM

First Semester

Ap S 1: Engineering in Modern Society (1)
Engl 1 or 1x: English Composition (3)
Math 30: Precalculus (3)
Phys 1: General Physics (4)
Elective: Selected from humanities or social sciences (3)

* Staff of instruction for the academic year 1970–71.

Second Semester

Ap S 2:	Engineering in Modern Society (1)
EE 51:	Applications of Computers (3)
Math 31:	Calculus of One Variable (3)
Phys 2:	Introduction to Modern Physics (4)
Elective:	Selected from humanities or social sciences (3)

Third Semester

Chem 13:	General Chemistry (4)
E Ad 115:	Probabilistic and Statistical Methods in Engineering (3)
Math 32:	Calculus of Several Variables (3)
Phys 31:	Introduction to Theoretical Physics (2)
Phys 51:	Introduction to Experimental Physics (2)
Elective:	Selected from humanities or social sciences (3)

Fourth Semester

Ap S 59:	Introductory Analytical Mechanics (4)
Ap S 113:	Engineering Analysis I (3)
CE 140:	Materials Science (3)
Phys 32:	Introduction to Theoretical Physics (2)
Phys 52:	Introduction to Experimental Physics (2)
Elective:	Selected from humanities or social sciences (3)

Fifth Semester

Ap S 114:	Engineering Analysis II (3)
EE 11:	Linear Networks I (3)
EE 31:	Fields and Waves I (3)
EE 60:	Introductory Electrical Engineering Laboratory I (2)
ME 131:	Thermodynamics (3)
Elective:	Selected from humanities or social sciences (3)

Sixth Semester

EE 12:	Linear Networks II (3)
EE 20:	Introductory Engineering Electronics (3)
EE 61:	Introductory Electrical Engineering Laboratory II (2)
EE 152:	Introduction to Digital Computers (3)
ME 126:	Fluid Mechanics (3)
Elective:	Selected from humanities or social sciences (3)

Seventh Semester

EE 121:	Engineering Electronics and Design (3)
MeaS 101:	Measurement Science (3)
MeaS 111:	Introductory Instrumentation (3)
MeaS 121:	Mechanical Measurement (3)
MeaS 122:	Heat Measurement (3)
MeaS 131:	Measurement Laboratory (3)

Eighth Semester

EE 122:	Pulse and Waveshaping Electronic Design (3)
EE 160:	Electrical Measurements (3)
MeaS 102:	Measurement Science (3)
MeaS 112:	Instrumentation (3)

MeaS 123: Pressure Measurement (3)
MeaS 132: Measurement Projects Laboratory (3)

COURSES

101–2 **Measurement Science** (3–3)

Fundamental concepts in measurement science; standards, error, accuracy, precision, measurement, and comparability. Design of experiments. Prerequisite: senior status. (Academic year—evening)

111 **Introductory Instrumentation** (3)

Theory, design, and application of simple transducers; design of instrumentation of one-type systems; analysis and design of simple instrumentation. Prerequisite: EE 20. May be taken for graduate credit. (Fall—evening)

112 **Instrumentation** (3)

Analysis and design of transducers and instrumentation for measurement in systems containing multiple quantities of one type or mixtures of types. Prerequisite: MeaS 111. May be taken for graduate credit. (Spring—evening)

121 **Mechanical Measurement** (3)

Precise measurements of mass and length; mechanical and interferometric methods. Prerequisite: senior status. May be taken for graduate credit. (Fall—evening)

122 **Heat Measurement** (3)

Temperature scales; measurement by resistance thermometry, thermocouples, pyrometry, vapor pressure thermometry; heat transfer quantities and their measurement; calorimeters, flow calorimeters. Prerequisite: senior status. May be taken for graduate credit. (Fall—evening)

123 **Pressure Measurement** (3)

Experimental techniques for quantitative measurement of pressure; working gages, standards, calibration procedures; methods and apparatus for observations near atmospheric pressure, in the high pressure range, and in the vacuum range. Prerequisite: senior status. May be taken for graduate credit. (Spring—evening)

131 **Measurement Laboratory** (3)

Design of test and test measurement of various electrical, mechanical, and heat quantities in simple and complex systems. Data treatment and reporting of results. Introduction to quality control operations. Prerequisite: E Ad 115. Prerequisite or concurrent registration: MeaS 101. (Fall—evening)

132 **Measurement Projects Laboratory** (3)

Individual selected measurement problems of some complexity. Prerequisite: MeaS 131. Prerequisite or concurrent registration: MeaS 102. (Spring—evening)

198 **Research** (1 to 3)

Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status. (Fall and spring)

GRADUATE STUDY

FIELDS AND AREAS OF CONCENTRATION

General Measurement Science

201 Advanced General Metrology

203–4 Probability and Statistics of Metrology

Precise Measurements

242 Precise Microwave Measurements

243 Precise Optical Measurements

244 Precise Electrical Standards

COURSES

201 Advanced General Metrology (3)

Topics in the conceptual, physical, and mathematical aspects of measurement, standards, design for precision measurement, and measurement at extreme values. Prerequisite: graduate status. (Fall—evening)

203–4 Probability and Statistics of Metrology (3–3)

Probability distributions, discrete and continuous distributions; sampling, combinatorial analysis; stochastic processes; conditional probability; correlation; analysis of variance; design and analysis of experiments, Latin Square experiments, factorial experiments, block and lattice design. Prerequisite: E Ad 115 or equivalent. (Academic year—evening)

242 Precise Microwave Measurements (3)

Precise measurement of power, frequency, impedance, wavelength, and attenuation at microwave frequencies; characteristics and Q of resonant devices; calibration of microwave components; design of microwave experiments. Prerequisite: EE 133 or equivalent. (Spring—evening)

243 Precise Optical Measurements (3)

Optical constants of lens systems; aberration; resolving power; illumination in focal plane; image evaluation, magnification, index of refraction; color and color temperature. Prerequisite: graduate status. (Fall—evening)

244 Precise Electrical Standards (3)

Concepts of standards, errors; design of resistance, capacitance and inductance standards; d-c voltage standards; frequency and time standards; dielectric and magnetic materials, attenuation standards, power standards, transfer standards. Prerequisite: EE 160 or equivalent. (Spring—evening)

298 Research (arr.)

Research as arranged. May be repeated for credit. (Fall and spring)

299–300 Thesis Research (3–3)

(Fall and spring)

398 Advanced Reading and Research (arr.)

Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

399 Dissertation Research (arr.)

Limited to Doctor of Science candidates. May be repeated for credit. (Fall and spring)

Required Courses in Engineering Undergraduate Curricula Offered by Columbian College of Arts and Sciences

r convenience, descriptions of required courses in undergraduate curricula ich are offered by Columbian College of Arts and Sciences are listed here. e the *Undergraduate and Graduate Catalogue* for elective courses in the manities and social sciences.

EMISTRY

13 General Chemistry (4)

Lecture (3 hours), laboratory (3 hours), recitation (1 hour). Atomic structure, chemical bonding; chemical equations; oxygen, hydrogen, acids, and bases; chemical equilibrium; liquid and solid states; periodicity; electrochemistry; organic chemistry. Prerequisite: Math 31, Phys 2. Laboratory fee, $18. (Fall—day)

NGLISH

***1 English Composition (3)**

Analysis and practice of expository techniques with emphasis on unity, development, organization, and coherence; library research procedure. (Fall and spring—day and evening)

***1x English Composition (3)**

Intensive course in English grammar and composition for students inadequately prepared for Engl 1. Begins with detailed instruction, drill, and exercises in basic structure of the English language and in writing paragraphs; continues with content of Engl 1. Engl 1*x* meets five hours a week and carries 3 semester hours of credit. Total fee, $247 (tuition fee of $222 plus additional fee of $25). (Fall—day and evening; spring—evening)

OLOGY

136 Engineering Geology (3)

Geological principles and processes and their application to civil and mechanical engineering. Prerequisite: Math 31, Phys 2; or permission of instructor. (Spring—day)

ATHEMATICS

30 Precalculus (3)

Set theory, inequalities, basic analytic geometry, functions and relations. Polynomial, trigonometric, logarithmic, and exponential functions. Prerequisite: Math 3 and 6; or one and one-half years of high school algebra, one year of high school geometry, and one-half year of high school trigo-

* Students whose College Board English Composition Achievement Test scores suggest inadequate preparation may be assigned to Engl 1*x* or may be tested in vocabulary, spelling, grammar, standard usage, and writing skill, before placement in either Engl 1*x* or 1. Students whose College Board scores indicate marked superiority will be allowed to waive the Engl 1 requirement. Waiving the requirement does not entitle students to any semester hours of credit.

nometry; or equivalent. Prior to registration, new students should take placement examination in algebra and trigonometry. (Fall and spri —day and evening)

31 Calculus of One Variable (3)

Differentiation and integration of algebraic and elementary transcendental functions, with simple applications. Prerequisite: Math 30* or equivalent. (Fall and spring—day and evening)

32 Calculus of Several Variables (3)

Partial derivatives, multiple integrals, infinite series. Prerequisite: Math 31. (Fall and spring—day and evening)

33 Calculus of Vector Functions (3)

Elementary linear algebra, vectors, and matrices. Vector calculus, implicit function theory. Prerequisite: Math 32. (Fall and spring—day and evening)

PHYSICS

†1 General Physics (4)

Topics in classical physics which form a foundation for modern physics. Prerequisite: two years of college preparatory mathematics or concurrent registration for Math 6. Laboratory fee, $11. (Fall—day and evening; spring—day)

2 Introduction to Modern Physics (4)

Selected topics in modern physics, including electromagnetic phenomena. Prerequisite: Phys 1 or equivalent. Phys 1 may be waived on the basis of the College Entrance Examination Board Achievement Test or Advanced Placement Examination or by a departmental examination prior to registration. Laboratory fee, $11. (Fall—day; spring—day and evening)

31–32 Introduction to Theoretical Physics (2–2)

Theoretical structure of physics, emphasis on appropriate analytical techniques. Prerequisite: two semesters of calculus and Phys 2. (Academic year—as arranged)

51–52 Introduction to Experimental Physics (2–2)

Experiments and lectures on the basic phenomena of physics and techniques of experimentation. Prerequisite: Phys 2 and two semesters of calculus. Laboratory fee, $11 a semester. (Academic year—day evening)

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* Students who are adequately prepared may take a waiver examination for Math 30. Passing waiver examination does not entitle students to any semester hours of credit.

† Students who are adequately prepared may take a waiver examination for Phys 1. Passing waiver examination does not entitle students to any semester hours of credit.



PECIAL PROGRAMS

Institute for the Study of Fatigue, Fracture, and Structural Reliability

MAJOR RESOURCE CENTER at the School of Engineering and Applied Science the Institute for the Study of Fatigue, Fracture, and Structural Reliability. It under the technical direction of Dr. A.M. Freudenthal, an internationally cognized authority. In addition to advancing interdisciplinary research, the stitute provides specialized training for graduate students in these fields.

The basic objective of the Institute is to develop an interdisciplinary approach fatigue research through close cooperation of research workers from differ- nt fields. The Institute deals principally with the study of the physical mech- nism of damage initiation, in order to establish principles for the rational esign of metal alloys of superior fatigue performance on the one hand, and to evelop advanced methods of fatigue design and reliability on the other. Be- ause of the large volume, past and current, of straight fatigue testing of stand- rd test specimens in industrial, government, and university laboratories, no sting of this type is generally conducted by the Institute. However, results f such tests appearing in publications and reports are carefully scrutinized for heir significance in terms of the purposes of the Institute.

The Institute conducts seminars, issues technical reports, and supplies infor- nation, lectures, and consultations to many government and industrial research nd development laboratories.

Institute for Management Science and Engineering

THE INSTITUTE FOR MANAGEMENT SCIENCE AND ENGINEERING defines and de-
velops new management techniques required to keep pace with our ever-ex-
panding technology. It provides a multidisciplinary environment for innova-
tive graduate teaching and substantial opportunities for research activities and
public service under diversified sources of external support. The principal aca-
demic fields directly involved are operations research, management science
and the computer sciences.

The programs of the Institute are concerned with important educational and
public-service needs for conservation of national resources. Such programs
require full-time interaction between students, faculty, and staff in ways pos-
sible only at universities. The Institute works closely with the University's
Program of Policy Studies in Science and Technology in the application of
developing technologies to contemporary problem areas. Through its Program
in Logistics, the Institute performs research leading to the development of a
science of logistics featuring principles and methodology for resource alloca-
tion problems in civil affairs and national defense efforts.

Participation by faculty members and graduate students from all schools
in the University is encouraged as consistent with the multidisciplinary ob-
jectives of the Institute. Graduate students are supported through research
assistantships with thesis and dissertation efforts ordinarily being the major
work responsibilities. Reliance is also placed on staff research specialists, and
there are special provisions for substantial contributions from "distinguished
visitors" from government, private industry, and other universities.

The Institute disseminates its results through seminars, colloquia, conferences,
and a special series of monographs. All of the research is unclassified.

The GWU—NASA-Langley Graduate Program

GEORGE WASHINGTON UNIVERSITY, in cooperation with the National Aeronautics
and Space Administration's Langley Research Center, has initiated a full-resi-
dent graduate engineering program at NASA-Langley, in Hampton, Virginia,
approximately 200 miles south of Washington, D.C. Through special arrange-
ment, the University's on-campus students in various fields of engineering can
utilize, when feasible, NASA-Langley's extensive scientific and engineering
facilities and equipment. In addition, the faculty at NASA-Langley may be
called upon to teach specialized courses at the School of Engineering and Ap-
plied Science.

The program at NASA-Langley leads to the degree of Master of Science in
the fields of acoustics, aerospace engineering (including options in aeronautics
and astronautics), applied mechanics, computer science, electrical engineering,
and mechanical engineering. Areas of study and research include acoustics,
solid mechanics and materials science, electronics, fields and waves, computer
science, structural engineering, fluid mechanics, thermal sciences, controls and
systems, networks, mathematical methods in engineering, and aerospace en-
gineering with options in aeronautics and astronautics.

Naval Ship Research and Development Laboratory, Annapolis, Maryland

CO-OP UNDERGRADUATE PROGRAM

THIS UNDERGRADUATE PROGRAM is an organized plan which integrates formal study at the School of Engineering and Applied Science with practical experience at the Naval Ship Research and Development Laboratory. During this 5-year program it is possible for the student to earn more than $10,000 on planned technical work assignments at the Naval Ship Research and Development Laboratory, obtain a Bachelor of Science degree in such areas as civil, electrical, or mechanical engineering, and be in a preferred position upon graduation to obtain a permanent Civil Service position with a grade and salary commensurate with the student's education and experience.

The employment is related to the field of study in which the student is engaged, and it is diversified in order to afford breadth of experience. The work experience increases in difficulty and responsibility, and in general parallels the student's progress through the academic phases of his education.

Tuition, textbooks, and fees (exclusive of room and board) up to 50 per cent may be granted on request. If tuition assistance is received, the Co-Op student must agree to serve as a government civilian employee after graduation for a period equal to the period for which tuition is granted.

To participate in this cooperative program, the student must be academically acceptable to the University and must meet the requirements of the Civil Service Commission for employment at the Naval Ship Research and Development Laboratory. For additional information, write to the Director of Engineering Admissions, School of Engineering and Applied Science, George Washington University, Washington, D.C. 20006.

GRADUATE PROGRAM

A pilot, off-campus graduate program has been initiated in cooperation with the Naval Ship Research and Development Laboratory. Programs of study lead to a Master's degree in the fields of electrical engineering, engineering administration, and ocean engineering. The programs are open to all qualified applicants in the Annapolis area. Students not seeking a degree may register for courses offered in this program providing they have the approval of the faculty adviser at the time of registration. For additional information write to the Director of Engineering Admissions, whose address is given in the preceding paragraph.

The Center for Measurement Science

THE CENTER, UNDER THE DIRECTION of the School of Engineering and Applied Science, is a cooperative activity of the University, industry, and government providing education, research, and service programs related to measurement. It was established by the University in 1960.

The principal, but not exclusive, activities of the Center are

The education of persons for careers in measurement science;

The development and improvement of measurement, standardization, and calibration techniques, apparatus, and data—with particular reference to high precision;

The provision of staff and facilities to industry for research and consultation on measurement problems in industry, including the maintenance of primary standards of measurement directly traceable to the national standards;

The publication of results of research, manuals of practice and procedures, and information related to measurement science.

The Center maintains relations with industry and government through its Associate Program, in which interested individuals, companies, or other organizations may participate. The mutual communication, collaboration, and support made possible by this program bring vitality to the Center activities and insure attention to the needs of industry and government.

Through these and other activities the Center serves as a source of personnel competent in measurement science, as an instrument for collaborative research on measurement problems, and as a service organization providing expert capability to industrial and government organizations in the solution of their measurement problems.

EDUCATION PROGRAM

The Education Program of the Center consists in part of curricula offered by the School, which prepare the student to assume responsibilities in the field of measurement science. The curricula are integrated, to permit a student to terminate his formal education at any level, or to proceed to the next level. Programs lead to the degrees of Bachelor of Science, Master of Science, and Doctor of Science.

In addition to the degree programs, the education program includes seminars, special conferences, and short courses offered from time to time.

RESEARCH PROGRAM

The Research Program of the Center includes all aspects of research and development related to measurement science. Research and/or development may be undertaken as independent studies by staff members for the Center, as studies for a sponsor under contract, or by personnel of Associates of the Center assigned to the Center to undertake the specific work. Associates receive publications of the Center; certain publications may be restricted in distribution.

SERVICE PROGRAM

The Center arranges for consultation and assistance of the Faculty and Staff and the use of the facilities of the Center in connection with specific problems in measurements. The program is restricted to the use of the Associates of the Center.

The Service Program also makes it possible for Associates to engage the various resources of the University, through the Center, as may be desirable and feasible, in solution of their problems of measurement.

Continuing Engineering Education Program

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE has recently undertaken a major expansion in its program of continuing engineering education. The objective of this program is the specific enhancement of the competence of the individual as a practicing engineer, rather than the attainment of an additional academic degree. Studies of the American Society for Engineering Education and other groups have emphasized the increasing importance of such programs as each year brings greater scientific and technological advances.

In the past several years the School has offered a small number of courses in continuing engineering education. The response to these courses has indicated that there is an unfulfilled need in this area of study. In the Northeast, Middle West, and West Coast areas, a number of universities are already offering several hundred such courses. However, in the Middle Atlantic and South Atlantic regions, and particularly in the Washington metropolitan area, no regional university has offered more than token services.

In its expanded program, the School offers an adequate number of courses each year; approximately half of them last five days (30 classroom hours); the remainder meet either for three days (18 classroom hours) or one night a week for eight weeks (16 classroom hours).

In addition to the School's faculty, lecturers and instructors for these courses are drawn from industry and government—the National Bureau of Standards, NASA-Goddard Flight Center, and NASA-Langley Research Center.

GENERAL INFORMATION

Registration

THE DATES, HOURS, AND PLACE OF REGISTRATION will be stated in the *Schedu of Classes*, which is available well in advance of each semester.

A student cannot register for classes until he has received a letter of admis sion to the University issued by the appropriate admitting office.

No registration is accepted for less than a semester or one summer sessio

A student may not register concurrently in this University and another ins tution without the prior permission of the dean of the college, school, or div sion in which he is registered in this University. Registration in more than co college, school, or division of the University requires the written permission the deans concerned, *prior to registration*. Allowance of credit for work don concurrently at another institution is at the discretion of the appropriate com mittee.

ELIGIBILITY FOR REGISTRATION

Registration for the following categories of campus students is held on the day of registration stated in the University Calendar. A student who is suspende or whose record is not clear for any reason is not eligible to register.

New Student.—Upon receipt of a letter of admission, the new student eligible for registration on the stated days of registration.

Readmitted Student.—A student previously registered in the University wh was not registered for campus courses during the preceding semester or sum mer session must apply for and receive a letter of readmission from the appro priate admitting office before he is eligible for registration. A student registered for the spring semester of 1971 need not apply for readmission for the fa semester 1971–72. Such a student is a "Continuing Student."

Continuing Student.—The student registered for campus courses in the im mediately preceding semester of the academic year is eligible to register upo presentation of his student identification card from the previous semester. T student registered for the 1971 Summer Sessions campus courses, and not r

stricted to summer registration, is eligible to register for the 1971–72 fall semester on presentation of his 1971 Summer Sessions student identification card.

REGISTRATION CHANGES AND WITHDRAWALS (see pages 109–10, 116–17)

Fees and Financial Regulations

FEES PAID BY STUDENTS cover only a portion of the cost of the operation of the University. Income from endowment funds, grants, and gifts from alumni and friends of the institution make up the difference.

The following fees and financial regulations were adopted for the academic year 1971–72. (See pages 107–8 for projected tuition increases for 1972–75.)

Tuition Fees

For undergraduate study:

Full-time program (12 or more hours a semester)	$1,050.00
Part-time program, for each semester hour	74.00

For graduate study* (except for those students registered before July 1, 1967, who wish to continue payments in accordance with the plan (see below) in effect prior to that date):

For each semester hour for which the student registers	74.00

Doctoral students not enrolled under the payment plan in effect before July 1, 1967, are required to register for minimum hour-loads,† as follows:

1. Full-time doctoral students must register for a minimum of 12 semester hours a semester until 24 hours of work have been completed beyond the qualifying examination; and a minimum of 4 semester hours a semester thereafter until the satisfactory completion of the final examination.
2. Part-time doctoral students must register for a minimum of 6 semester hours a semester until 24 hours of work have been completed beyond the qualifying examination; and for a minimum of 4 semester hours a semester thereafter until the satisfactory completion of the final examination.

For candidates for Master's degrees registered prior to July 1, 1967, who wish to continue payments according to the plan in effect prior to that date:

Total fee, including the Master's Comprehensive Examination‡	2,100.00

* Registration in thesis courses (299–300) entitles the student, during such registration, to the advice of the member of the faculty under whom the thesis is to be written. In case a thesis is unfinished an additional semester will be granted, requiring payment of a "Continuous Registration" fee (see page 107). If the preparation of the thesis extends beyond the three-semester period, approval for this extension will be required and the student must repeat the thesis course 300 and pay tuition as for a repeated course, provided the over-all time limit for earning the degree is not exceeded.

† No minimum hour-load is required during the summer sessions.

‡ Students completing payment of the total fee before completion of the required work (including thesis and comprehensive examinations) will be granted registration on a "continuous registration—no charge" basis for one semester immediately following the semester in which tuition payment is completed.

Students requiring additional time for completion of required work after completion of payment of the total fee and the expiration of a semester "continuous registration—no charge" must register each semester and pay the normal "continuous registration" fee. See page 118 for regulation governing Military Leave.

For students registered for the degree of Doctor of Science prior to July 1, 1967, who wish to continue payments according to the plan in effect prior to that date:

For work leading to and including the qualifying examination*	$2,050.00
For work leading to and including the final examination*	2,050.00

University Center Fee (charged all students registered on campus,† nonrefundable

For students registered for 11 or more semester hours on campus: Each semester	37.50
For students registered for less than 11 semester hours in a semester on campus: For each semester hour for which the student registers	3.50
For students maintaining "continuous registration" status: Each semester	3.50

Additional Course Fees

In certain courses additional fees, such as laboratory and material fees, are charged These fees are charged by the semester and, unless otherwise indicated, may be de frayed in two payments when the tuition is paid in this manner. Breakage of apparatus is charged against the individual student. When breakage is in excess of the normal amount provided for in the laboratory fee the individual student will be required to pay such additional charges as are determined by the department concerned.

Graduation Fees

Bachelor's, Master's, Doctor's degrees	$25.00
Fee for binding Master's Thesis	10.00
Fee for Microfilm Service and Printing Announcement of Final Examination for the Doctoral Degree	60.00

Residence Hall Fees (see page 127).

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* If the tuition for the first stage is paid in full at the beginning of the first stage of the doctoral discipline, the candidate is entitled to five successive semesters on a "continuous registration—no charge" basis. If still more time is needed, the student must maintain continuous registration and pay the continuous registration fee.

If the tuition is paid in four installments at the rate of $512.50 a semester at the beginning of the first stage of the doctoral discipline, no continuous registration fee will be charged if a third year is needed for completion of the first stage of the degree requirements. If still more time is needed, the student must maintain continuous registration and pay the continuous registration fee. If the tuition is paid in six installments at the rate of $341.66 a semester and if still more time is needed, the student must maintain continuous registration and pay the continuous registration fee.

If the tuition for the second stage is paid in full at the beginning of the second stage of the doctoral discipline the candidate is entitled to three successive semesters on a "continuous registration —no charge" basis. If still more time is needed, the student must maintain continuous registration and pay the continuous registration fee.

If the tuition is paid in two installments at the rate of $1,025.00 a semester at the beginning of the second stage of the doctoral discipline no continuous registration fee will be charged if a second year is needed for completion of this stage of the discipline. If the tuition is paid in four installments at the rate of $512.50 a semester at the beginning of the second stage and still more time is needed, the student must maintain continuous registration and pay the continuous registration fee.

† Students in off-campus programs are charged the University Center Fee only when registered for courses on campus.

Special Fees

Application fee (degree candidates), nonrefundable	$25.00
Tuition deposit, nonrefundable:	
Charged each entering or readmitted full-time undergraduate student, except early decision freshmen	100.00
Charged each freshman admitted by early decision plan	200.00
Application for room reservation, nonrefundable:	
Charged each resident student, except early decision freshmen	100.00
Charged each resident student admitted by early decision plan	200.00
Admission tests (when required)	6.00–12.00
Late-registration fee, for failure to register within the designated period	15.00
Late payment fee, charged for failure to make payments when due (see "Payment of Fees," page 108)	15.00
Financial reinstatement fee, for reinstatement after financial encumbrance for nonpayment of fees (see "Payment of Fees," page 108)	35.00
Returned check fee, charged a student whose check is returned because of insufficient funds or improper drafting	15.00
Continuous registration fee, to maintain "continuous registration" status during any semester of absence from the University or after completion of tuition requirements*—due and payable on the official days of registration	74.00
Engineers' Council fee, charged each student in the School of Engineering and Applied Science for each semester or any part thereof except the summer term	5.00
For each examination to qualify for advanced standing and for each special examination	5.00
English test for foreign students (when required)	5.00
Laboratory checkout fee, for failure to check out of Chemistry laboratory by the date deadline set by the instructor†	3.00
Transcript fee, for each transcript of record	2.00

Registration for on-campus courses in the University entitles each student to the following University privileges: (1) the services of the Student and Alumni Career Services Office; (2) the use of University Library; (3) gymnasium privileges; (4) admission to all athletic contests, unless otherwise specified; (5) subscription to the *University Hatchet*, the student newspaper; (6) admission to University debates; (7) medical attention as described under Student Health Services. These privileges terminate when the student withdraws or is dismissed from the University.

PROJECTED TUITION INCREASES 1972–75

In order that students and their parents may plan more realistically for a total four-year period, tuition increases for the academic years 1972–73, 1973–74, and 1974–75 have been estimated as follows:

Increase by year (full-time undergraduate students):	
1972–73	$150.00
1973–74	150.00

* Payment of the continuous registration fee entitles the student who is granted leave of absence to return and continue his work toward a degree under the academic requirements which were in force at the time of his first registration. The continuous registration fee applies toward neither tuition fee nor residence requirements for the degree. (See also footnotes on pages 105 and 106.)

† See page 118 for regulation governing Military Leave.

‡ A student who drops a chemistry course before the end of the semester must check out of the laboratory at the next regular laboratory period.

1974–75 ..... $150.00

Increase by semester hour (graduate and part-time undergraduate students):

1972–73 ..... 8.00
1973–74 ..... 6.00
1974–75 ..... 6.00

Every effort will be made to keep tuition increases within the above limits. However, it is not possible to project future economic data with certainty, and circumstances may require an adjustment in these estimates.

PAYMENT OF FEES

No student is permitted to complete registration or attend classes until all charges are paid. Tuition and fees for each semester are due and payable in full at the Office of the Cashier at the time of each registration. Checks and postal money orders should be made out to George Washington University.

The Student Accounts Office has responsibility for billing and maintaining student accounts for tuition, various fees, and room and board charges. A student registered for six semester hours or more may sign a deferred payment contract with the Student Accounts Office at the time of each registration permitting him to pay one-half of the total tuition and fees (except for fees payable in advance) at the time of registration and the remaining half on or before November 3, 1971 (for the fall semester), and March 15, 1972 (for the spring semester). Interest at the rate of eight per cent per annum on the unpaid balance will be charged from the date of registration to the date payment is made. The University will not obligate itself to notify the student, in advance, of the payment-due date for the second half of the semester charges.

Students receiving tuition assistance in the form of scholarships, government tuition contracts, or other forms of tuition awards are not permitted to sign deferred payment contracts unless the total tuition and fee charges exceed the value of the tuition awards by $465 or more. Under such circumstances the student may be permitted to pay one-half of the amount due from the student at the time of registration and to defer the balance by signing a deferred payment contract.

Students who fail to make any payment when due will be automatically charged a $15 late payment fee. Accounts which become 30 days past due will be financially encumbered and will be subject to the interest charge of eight per cent per annum. In the event a student's account is financially encumbered, the student forfeits his rights to the use of deferred payment contracts in future semesters, and the Student Accounts Office will notify the Registrar to withhold grades, future registration privileges, transcripts, diplomas, and other academic information until the account is settled financially. Financial settlement will require payment in full of all amounts due the University in addition to a financial reinstatement fee of $35.

Students auditing courses are subject to all fees charged to students registered for credit.

Because many parents may wish some option in meeting and financing all or part of the cost of a college education, the University offers educational loan plans through the Girard Trust Bank in Philadelphia, Pennsylvania; Funds for

Education, Inc., Manchester, New Hampshire; and The Riggs National Bank, Washington, D.C.

Although similar in purpose, these plans vary somewhat in coverage and conditions. One-year and multiple-year plans are available. Insurance covering the life and health of the sponsor is provided through these plans.

Individuals over twenty-one years of age who are employed full-time are also eligible to apply. They may sponsor their own contracts, provided they meet the conditions specified by the plan for which they are applying.

Brochures and applications describing these plans are available in the Office of Student Financial Aid.

WITHDRAWALS AND REFUNDS

Applications for withdrawal from the University or for change in class schedule must be made in person or in writing to the Dean of the School. Notification to an instructor is not an acceptable notice (see "Withdrawal," pages 116–17).

Refunds are granted only during the fall and spring semesters; no refunds are granted during the summer sessions. In authorized withdrawals and changes in schedule, cancellations of semester tuition charges and fees will be made in accordance with the following schedule:

1. *Complete withdrawal* from the University:

Fall Semester

Withdrawal dated on or before September 24, 1971	90 per cent
Withdrawal dated September 27 to October 8, 1971	75 per cent
Withdrawal dated October 11 to October 22, 1971	50 per cent
Withdrawal dated after October 22, 1971	none

Spring Semester

Withdrawal dated on or before February 4, 1972	90 per cent
Withdrawal dated February 7 to February 18, 1972	75 per cent
Withdrawal dated February 21 to March 3, 1972	50 per cent
Withdrawal dated after March 3, 1972	none

2. For a *change in status from full-time to part-time student* or for *partial withdrawal* by a *part-time student*, the above schedule applies to the difference in charges between the original program and the adjusted program continuing in effect.
3. A student enrolled in a full-time program who drops or adds a course and continues to be in a full-time program will have no financial adjustments of tuition made other than those involving course fees.
4. A student who is granted military leave before completing the semester will receive credits for current charges in accordance with the schedule for complete withdrawal from the University (see No. 1 above). Payments made in excess of the nonrefundable balance will be refunded to the student. The nonrefundable balance will be maintained as a deferred credit for use by the student when he returns to the University (see "Military Leave," page 118).
5. Regulations governing student withdrawals as they relate to residence hall and food service charges are contained in the specific lease arrangements.

In no case will tuition be refunded or reduced because of absence from classes.

Payment applies only to the semester for which a registration charge is incurred, and in no case will this be credited to another semester.

Authorization to withdraw and certification for work done will not be given a student who does not have a clear financial record.

Students are encouraged to provide their own cash funds until they can make banking arrangements in the community.

Financial Aid*

FOR UNDERGRADUATE STUDY

THE GEORGE WASHINGTON UNIVERSITY has a program of financial assistance for undergraduate students in the form of scholarships, loans, grants, part-time employment, or any combination of these resources. The University participates in the National Defense Student Loan, Educational Opportunity Grant, and College Work-Study programs. Financial aid is awarded on the basis of the student's scholastic record, financial need, and qualities of leadership and character.

Scholarships are awarded for the academic year.

Applications and supporting credentials for financial aid must be filed by February 1 (entering freshmen), March 1 (enrolled undergraduate or entering transfer students) preceding the academic year of the award for the fall semester; by October 31, for the spring semester; and by May 1, for the summer session†.

Credentials required of all financial aid applicants:

1. *Application for Financial Aid* forms for entering freshmen and transfer students will automatically be forwarded to the student when the Office of Admissions notifies the Office of Student Financial Aid that an Application for Admission has been received and the student indicates he will apply for financial aid. Students presently enrolled in the University may obtain forms upon request, at the Office of Student Financial Aid.

2. *Parents' Confidential Statement* (Code 5246) must be filed by all applicants who are under twenty-five years of age, married or single, dependent on or independent of parental support. Students who are applying for aid for the academic year (September–June) and for the spring semester should file the Parents' Confidential Statement with the College Scholarship Service, Box 176, Princeton, N.J. 08540; Box 1925, Berkeley, Calif. 94701; or Box 881, Evanston, Ill. 60204, no later than two weeks prior to the deadline dates for application, see dates above. Students applying for financial aid for the summer session *only* should file the Parents' Confidential Statement directly with the Office of Student Financial Aid, George Washington University.

Entering freshmen may obtain forms at local secondary schools or upon re-

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* For information concerning financial aid for students from foreign countries, see page 118.

† A Summer Sessions student is eligible for consideration only if he is enrolled in this University for at least 8 semester hours in the immediately preceding spring semester or has applied for financial aid for the following fall semester.

quest to the College Scholarship Service. All other applicants may obtain forms, upon request, at the Office of Student Financial Aid.

An undergraduate *transfer* student is not eligible for scholarship funds until he has completed one full semester (15 hours) at this University with a minimum average of *B* (3.0). A transfer student is, however, immediately eligible for other types of financial aid.

SCHOLARSHIPS

Scholarships are awarded for the academic year unless otherwise specified and are credited in equal parts for each semester. Each holder must carry a full schedule of academic work during the period for which the scholarship is awarded.

Applications should be submitted on or before February 1, for the following academic year and, unless otherwise specified, should be addressed to the Office of Student Financial Aid. Awards are made during the month of April. All scholarships begin with the fall semester.

The following scholarships are limited to students in the School of Engineering and Applied Science. The University offers many others which are open to engineering students. A special bulletin containing a complete list and full information concerning fellowships and scholarships may be obtained from the Office of Student Financial Aid, George Washington University, Washington, D.C. 20006.

Frederick Albert and Alma Hand Britten Scholarships (1959).—Bequest of Alma Hand Britten for scholarship assistance to students entering the School of Engineering and Applied Science who would not otherwise be able to pursue such professional study. Available for undergraduate and graduate study.

Henry Harding Carter Scholarship (1896).—Established by Maria M. Carter in memory of her husband to aid a deserving student who is preparing for the civil engineering profession. Available to students working toward the degree of Bachelor of Science (Civil Engineering).

Henry Parsons Erwin Scholarship (1955).—Established by Helen B. Erwin as a memorial to her husband, a former Trustee of the University. A partial scholarship for a student in Engineering and Applied Science.

Louis E. Giles Memorial Scholarships (1966).—Bequest of Susie E. Giles in honor and memory of her husband for scholarships to undergraduate and graduate students in the School of Engineering and Applied Science requiring financial assistance.

George Washington University Board of Trustees Scholarships.—Full- and partial-tuition undergraduate scholarships which will begin in the fall semester and extend for four successive academic years, provided the holder maintains a *B* average, as well as a high standard of deportment, and continues to be in financial need. Candidates must plan to select a curriculum leading to a Bachelor's degree.

GRANTS

The following funds have been established to meet the special needs of disadvantaged students from the District of Columbia Inner-City and the Washington Metropolitan area.

Educational Opportunity Grants.—Authorized by the Higher Education Act of 1965 and available to undergraduate students with great financial need. The applicant must show academic promise, be accepted for enrollment on a full-time basis, or be a currently enrolled full-time student in good standing. Students may receive Educational Opportunity Grants for each year of their higher education up to four years.

Educational Opportunity Program Tuition Grants (1968).—The University's Educational Opportunity Program (EOP) is designed to offer a four-year college education for as many District of Columbia high school graduates as are qualified and for whom funds and facilities are available. With a view to offering opportunities for higher education to a greater range of students, this program is one of many being provided by universities and colleges all over the country. The University's program is available only to graduates of District of Columbia high schools and/or other qualified District residents. It is specifically designed to meet the needs of students whose families cannot afford to send them to college, as well as those who have unrealized academic potential.

Marriott Corporation Grant (1968).—Funds provided by the Marriott Corporation to help a needy minority group student.

Walt Whitman High School Key Club Grant (1968).—Tuition and expense grant for a disadvantaged student from the District of Columbia. Supported by annual fund drives conducted by students of the Key Club at Walt Whitman High School in Bethesda, Maryland.

FOR GRADUATE STUDY

SCHOLARSHIPS, FELLOWSHIPS, ASSISTANTSHIPS, TRAINEESHIPS

The George Washington University program of financial assistance for graduate students includes graduate scholarships, fellowships, assistantships, and loans. Application for admission to graduate study is a prerequisite for consideration. The University participates in the National Defense Student Loan and College Work-Study programs.

Application and correspondence concerning graduate scholarships, fellowships, or assistantships, unless otherwise specified, should be sent directly to the Dean of the School, and addressed to George Washington University, Washington, D.C. 20006. Unless otherwise specified, application and supporting credentials should be submitted not later than March 1 preceding the period for which the award is made.

A separate application for National Defense Student Loans or the College Work-Study Program must be submitted to the Office of Student Financial Aid by April 1 for the following academic year.

Frederick Albert and Alma Hand Britten Scholarships (1959).—See page 111.

Paul H. and Margaret M. deMaine Scholarships (1967).—Full and partial scholarships for graduate students whose research involves the use of computers. Inquiries should be made to the Director of the Computer Center of the University.

Louis E. Giles Memorial Scholarships (1966).—See page 111.

Phi Delta Gamma Scholarship Endowment Fund (1968).—Established by the Beta Chapter of Phi Delta Gamma, national fraternity for graduate women. For graduate women students.

Graduate Teaching Fellowships.—Available to students in Master's and doctoral programs. Each teaching fellow renders a designated unit of service to his major department of instruction and receives a stipend of up to $2,800 (on a 9-month basis), plus tuition and course fees.

National Science Foundation Graduate Fellowships.—Fellowships, including tuition, fees, stipends of $2,400 to $2,800 (on a 12-month basis), and allowances of $500 a year for dependent spouse and each dependent child. No awards are made for clinical areas of study, education, business, or social work. Applications should be made to the Fellowship Office, National Academy of Sciences, National Research Council, 2101 Constitution Avenue, N.W., Washington, D.C. 20418.

National Science Foundation Graduate Traineeships.—Available to students in sciences. Traineeships include tuition, stipends of $2,400 to $2,800 (on a 12-month basis), and stipulated allowances for dependents. Inquiries and applications should be submitted prior to February 15 to the Graduate School of Arts and Sciences.

Research Assistantships in Operations Research and Related Fields.—Available to graduates, and to undergraduates on the junior and senior levels, in any school of the University. Research Assistants are expected to work 20 hours a week conducting research in support of an established research program, in programming or in conducting individual research on an approved research project. Stipends vary from $3,124 to $6,449, depending on the status of the student and the tenure of the appointment (9–12 months). Further information and applications are available from the Director, Institute for Management Science and Engineering, School of Engineering and Applied Science, George Washington University, Washington, D.C. 20006.

Resident Assistantships (men and women).—Available to graduate students and seniors in any field of study who are interested in working with the student personnel program in University residence halls. Specific duties vary with the position, but basically consist of counseling, advising student groups, and administration. Remuneration includes full tuition and a furnished room for the academic year. All positions are part-time, enabling staff members to enroll as full-time students. Further information may be obtained from the Office of the Dean of Students.

LOAN FUNDS

The following loan funds are available to students in the University in accordance with the qualifications placed thereon by the donors. Students should direct inquiries to and file applications with the Office of Student Financial Aid. Applicants for a National Defense Education Act Student Loan or a United Student Aid Fund Loan must file a *Parents' Confidential Statement* and an *Application for Financial Aid*. Deadline for submitting applications with supporting credentials is February 1 (entering freshmen), March 1 (enrolled undergraduate or entering transfer students), April 1 (graduate students) preceding the academic year of the award; October 31, for the spring semester; and May 1 for the summer session*. Application for admission to the University is a prerequisite for consideration.

* A Summer Sessions student is eligible for consideration only if he is enrolled in this University for at least 8 semester hours in the immediately preceding spring semester or has applied for financial aid for the following fall semester.

National Defense Education Act Student Loan Program.—This fund is available to full-time graduate or undergraduate students in good academic standing who are in need of financial assistance. An undergraduate student may borrow for college expenses a sum not exceeding $1,000 a year and, during his entire undergraduate program, a sum not to exceed $5,000. A graduate or professional student may borrow a maximum of $2,500 a year. The total loans made to such a student for all years, including any loans made to him as an undergraduate, may not exceed $10,000.

State Guaranteed Loan Program.—These loans, provided for in Title IV Part B of the Higher Education Act of 1965, are administered by each state. A student wishing further information should contact the Department of Higher Education in the state in which he is a legal resident.

Warren Stickler Memorial Loan Fund (1966).—A fund established by the Precision Measurements Association as a memorial to Warren Stickler is available to students in the Measurement Science curricula.

U.S. Loan Program for Cuban Students.—Cuban Nationals, enrolled as full-time students, who are unable to receive support from sources within Cuba because of action by the Cuban Government, may borrow not more than $1,000 a year or $500 for one semester.

United Student Aid Fund Loan.—This fund is available to full-time graduate and undergraduate students who have completed the freshman year and are in need of financial assistance. Students may borrow up to $1,500 a year. The total loans made to a student, including any loans made to him as an undergraduate, may not exceed $7,500. Application must be made and approved through the University by the date deadlines stated above.

John Brewster Willis, Jr., Loan Fund in Mechanical Engineering.—A fund of $1,515, established by Mrs. William L. Lane as a memorial to her nephew John Brewster Willis, Jr., is available to Mechanical Engineering students (graduate or undergraduate) who are primarily interested in aeronautics.

A number of short-time emergency loan funds are also available at the University. Information concerning these funds is contained in a special bulletin available from the Office of Student Financial Aid.

COLLEGE WORK-STUDY PROGRAM

The Federal College Work-Study Program provides part-time jobs both on and off campus for full-time students with financial need. Applications and information are available at the Office of Student Financial Aid.

STUDENT EMPLOYMENT

The Student and Alumni Career Services Office maintains a registry of both full-time and part-time positions available in the Washington area for undergraduate and graduate students.

After registration, interested students may apply at the Student and Alumni Career Services Office, 2033 G Street, N.W., for interviews and referrals to positions for which they are qualified.

FOREIGN STUDENTS

Undergraduate foreign students with proven financial need who have completed one semester of full-time work (15 hours) at this University with a *B* average (3.00) or better are eligible for consideration for University Board of Trustees Scholarships. Scholarships are awarded in the spring for the following academic year. See instructions for applying for undergraduate financial aid, pages 110–111.

Limited awards for graduate teaching fellowships are the responsibility of the chairman of the department or dean of the school in which the degree is to be earned. Work as a teaching fellow requires excellent knowledge of English—both spoken and written.

Long-term loan funds for undergraduate and graduate foreign students are limited in amount and are available only to those foreign-born persons who have established resident status in the United States through the Immigration and Naturalization Service.

Students who wish to study in the United States should have available sufficient funds to cover expenses for one full year before attempting to enter a college or university. The cost at this University for one academic year (September–June) is approximately $4,100. This estimate includes room and board, tuition, books, clothes, and incidental expenses; no travel, holiday, or medical expenses are included.

Prizes

Norman B. Ames Memorial Award.—Established by many friends of Professor Ames and awarded annually to a graduating senior of the School of Engineering and Applied Science who is nominated by his fellow students as having made significant contributions to the students in the School of Engineering and Applied Science and to the School and University.

Martin Mahler Prize in Materials Testing.—A one-year membership in the American Society for Testing Materials awarded to the upper division or graduate student in engineering who submits the best reports on tests in the materials laboratories course with preference given to prestressed concrete tests.

School of Engineering and Applied Science Distinguished Scholar.—A certificate awarded annually by the Faculty of the School of Engineering and Applied Science to the senior who graduates with the highest scholastic standing. The student's name is engraved on a plaque displayed in Tompkins Hall of Engineering.

Sigma Tau Prize.—A medal awarded annually by Xi Chapter to the freshman in the School of Engineering and Applied Science who maintains the highest scholastic standing in the work of the entire year.

Theta Tau Activities Plaque.—A plaque awarded annually by Gamma Beta Chapter to the senior in the School of Engineering and Applied Science with the most outstanding record in activities for the entire period of his attendance.

Regulations

A STUDENT ENROLLED in the School of Engineering and Applied Science is required to conform to the following regulations.

A student who withdraws or is suspended, or is otherwise absent from the University for one semester or more, may re-enter and continue his work only under the rules and regulations in force at the time of his return.

If a student knowingly makes a false statement or conceals material information on an application for admission, registration card, or any other University document, his registration may be canceled. If such falsification is discovered after the student has established an academic record at the University, he may be subject to dismissal from the University. Such a student will be ineligible (except by special action of the Faculty) for subsequent registration in the University.

ACADEMIC DISHONESTY

Academic dishonesty on the part of any student will result in a disciplinary grade of *F* for the course involved and also may, upon the recommendation of the appropriate dean's council, result in his suspension from the University for a stated period, at the end of which time he may petition for readmission. The disciplinary grade of "Failure—Academic Dishonesty" will be recorded for the course involved, and this grade will be employed in the computation of the quality-point index. A student so suspended shall be withdrawn from all other courses except those in which all work has been completed.

CHANGES IN PROGRAM OF STUDIES

A student may not make any changes in his approved program of studies without the approval of the Dean. Requests for change in class registration must be made on a form provided in the School Office.

During the seven days following the first day of classes of a semester, courses may be added to the student's program with the approval of the instructor, the faculty adviser, and the Dean.

Courses may be dropped by undergraduate students without academic penalty only during the fourteen days following the first day of classes, with the approval of the instructor, the student's adviser, and the Dean. Courses may be dropped by graduate students without academic penalty only within the first four weeks of a semester, with the approval of the instructor, the faculty adviser, and the Dean.

WITHDRAWAL

A student who withdraws or is otherwise absent from the University for one semester or more must apply for readmission. If readmitted, he continues his work under the requirements and regulations in force at the time of his re-admission.

Applications for withdrawal from the University or for change in class schedule must be made in person or in writing to the Dean of the School. Notification to an instructor is not an acceptable notice.

Withdrawal from a course or from the University, *without academic or finan-*

cial penalty, requires the permission of the Dean of the School. Permission to withdraw from the University will not be granted to a student who does not have a clear financial record.

Withdrawal from any course without academic penalty after the fourteenth day following the first day of classes of a semester may be granted by the Dean to undergraduate students only under the following conditions: (1) exceptional circumstances make the request necessary; (2) the request is submitted on the official form for late withdrawal; (3) as of the date of request, the grades in all courses involved are *C* or better. In exceptional circumstances the Dean may authorize withdrawal for graduate students without academic penalty after the first four weeks of a semester. In all cases financial regulations governing withdrawal remain in full effect.

All charges for courses dropped without the approval of the Dean must be met by the student. Reporting the dropping of a course to an instructor does not effect its discontinuance.

CREDIT

Credit toward a degree is given only after registration for and satisfactory completion of the required work of a course or upon the granting of advanced standing. A student who takes a course as an auditor may not take the same course later for credit.

On request the Registrar will issue to undergraduate degree candidates a balance sheet showing the amount of work completed and the requirements remaining to be met for the degree.

TRANSCRIPTS OF RECORD

Official transcripts of student records are issued by the Registrar on request of the student or former student who has a clear financial record. A fee of two dollars is charged for each transcript.

SUMMER SCHOOL CREDIT

A student who plans to attend summer school at another institution and apply credit so earned toward graduation from this University must first secure the written approval of the Dean. In no event will credit in excess of what might be earned in a similar period in this University be recognized.

CONTINUOUS REGISTRATION

Degree candidates are expected to maintain continuous registration until all degree requirements are satisfied. Students who have completed course registration (including the thesis) maintain continuous registration by paying the "continuous registration" fee (see page 107). By failing to register for one semester or more, the student breaks his registration and must be readmitted. The procedure for readmission to the graduate programs is the same as that for undergraduates (see page 15). A "Readmitted Student" is required to satisfy the academic requirements existing at the time of his readmission.

Students must be registered during the summer if they elect to take courses, are taking required examinations, are receiving guidance toward theses or dissertations, or are expecting to graduate at the end of the Summer Sessions.

GRADUATION REQUIREMENTS

To be recommended by the Faculty for graduation a student must have met the admission requirement of the School; completed satisfactorily the scholarship curriculum, residence, and other requirements for the degree for which he is registered; and be free from all indebtedness to the University. Registration either for course work or on the "continuous registration" fee basis, is required for the semester or summer session immediately preceding the awarding of the degree.

Application for Graduation.—Application for graduation must be filed and the appropriate fee paid at the time of registration for the last semester or summer session of the senior or final year.

Students completing degree requirements during the Summer Sessions will be awarded diplomas (no formal convocation) September 30, *provided* they have completed all degree requirements and have applied for graduation as a part of registration for the Summer Sessions.

Attendance and Conduct.—The University reserves the right to refuse to confer a degree upon a candidate whose attendance or conduct has been unsatisfactory.

THE LIBRARY

All students registered in the University have the privilege of using the University Library. Its stacks are open, and all students are welcome to browse at their leisure. The Student Identification Card, issued upon the payment of fees, must be presented when books are borrowed for outside use.

The loan period for most books available for outside circulation is 30 days. A fine of 25 cents is charged for each day a book is overdue. Any book which circulates is subject to recall by the Library if needed for reserve or other use. Reserve books must be used in the reserve reading room when the Library is open, except that they may be withdrawn for overnight use beginning at 8:30 p.m. A fine of 50 cents is charged for each hour or fraction thereof that a reserve book is overdue. Grades of a student are withheld until his library record is clear.

All students using the University Library are expected to be familiar with its detailed regulations, available on application to any of the Library's service desks.

MILITARY LEAVE

A student called to active duty may be granted military leave for the period of active duty, upon presentation to his Dean of a copy of his orders and a petition for such leave. The maintenance of "continuous registration" is not required of the student on military leave; however, he must apply for readmission to the University well in advance of the semester in which he expects to return. Payments for tuition and fees which are not refunded to the student at the time he is granted military leave will be maintained as a deferred credit for his account and use upon his return to the University.

UNIVERSITY POLICY ON THE RELEASE OF STUDENT INFORMATION

In general, the policy of the University is one of attempting to keep the student's record confidential and out of the hands of those who would use it for other than legitimate reasons. At the same time, the policy must be flexible enough not to hinder the student, the University, or the community in their legitimate endeavors.

No information concerning a student will be released except as noted below:

1. Information such as whether or not the student is currently enrolled; dates of attendance; verification of date and place of birth; degrees earned, if any, date, major field or area of concentration, and honors received; home and local addresses and telephone numbers; school, college, or division of enrollment, and class; verification of signature; name and address of parent or guardian.

2. The issuance of formal transcripts of record to recognized institutions of higher learning; the certification of academic achievement to the various recognized professional associations (law, medicine, engineering, education, etc.).

Additional information will be released only on written authorization from the student, or by court order or subpoena. If a subpoena is served, the student whose record is being subpoenaed will be notified and the subpoena will be referred to the University's legal counsel.

Government investigative agencies have no inherent right to access to student files and records. If expressly requested, properly identified representatives from federal, state, or local government agencies may be given the information listed under No. 1 above.

UNIVERSITY POLICY ON SELECTIVE SERVICE INFORMATION

The University notifies draft boards of a student's academic status only when the student requests or authorizes, in writing, that the draft board be notified. A Selective Service Information Card is put into the registration packet of each male student who has not reached his 26th birthday, registered on campus, exclusive of those in the National Law Center and the School of Medicine. This card contains the following statement:

> By my signature below, I hereby authorize the University to notify my draft board of my academic status in the University, or of any changes in academic status that occur during this semester.

If the student signs the card, the University then automatically notifies the draft board. If the student does not sign the card, no notification is sent. National Law Center students and students in the School of Medicine should check with the appropriate dean's office for details of the policy in their school.

RIGHT TO DISMISS STUDENTS

The right is reserved by the University to dismiss or exclude any student from the University, or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable to do so.

RIGHT TO MAKE CHANGES IN PROGRAMS

The right is reserved by the University to make changes in programs without notice whenever circumstances warrant such changes.

RIGHT TO CHANGE RULES

The University and its various colleges, schools, and divisions reserve the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

PROPERTY RESPONSIBILITY

The University is not responsible for the loss of personal property in its buildings. A "Lost and Found" Office is located on campus in the Safety and Security Office.

RECENTLY ESTABLISHED REGULATIONS

An Appendix (pages 149–50) contains regulations recently approved by the University's Board of Trustees.

Cooperative Programs

CONSORTIUM OF UNIVERSITIES OF THE WASHINGTON METROPOLITAN AREA, INC.

Five universities in Washington, D.C.—The American University, the Catholic University of America, *George Washington University*, Georgetown University, and Howard University—have formed a Consortium through which they are coordinating the use of their respective facilities. As the arrangement develops, juniors, seniors, and graduate students in approved programs leading to degrees in any one of the universities will increasingly have the opportunity to select from the combined offerings of all five universities the particular courses which best meet their needs.

Participation is limited to campus degree candidates. The following, however, are excluded: freshman and sophomore students, and students in Canon Law, Dentistry, Medicine, and Theology. Law students are also excluded from participation, except for candidates for the degree of Master of Laws at George Washington University and Georgetown University.

Special courses, such as private instruction (as in music or art) or tutorial study and courses in preparation for passing the language requirement, are excluded from the Consortium program. Also excluded are courses offered in Reserve Officer Training Corps programs.

Students interested in taking courses at any of the four other universities should consult the program announcements of the other universities. Consortium application forms and instructions are available from the Registrar after the student has obtained his registration packet. In order to participate in the Consortium program (1) the graduate student must obtain the approval of his adviser and should ascertain from the department of the university where the course is taught whether or not he is eligible for the course and whether there is a space in the class *or* (2) the undergraduate student must obtain the approval of his adviser and *must* ascertain from the department of the university where the course is taught whether or not he is eligible for the course and whether there is space in the class. Specific inquiries should be

addressed to the Registrar. *A student may not take courses at another university that are available at his own.*

The student registers and pays at his own university for all Consortium courses.

AIR FORCE RESERVE OFFICERS' TRAINING CORPS (AFROTC)

The Department of Aerospace Studies at Catholic University of America, under provisions of an agreement between George Washington University and Catholic University, offers a two-year AFROTC program.

The successful completion of the program qualifies the student for a reserve commission in the United States Air Force upon graduation. Exceptionally well-qualified students may receive a Regular Officer appointment. The program is designed to provide education that will develop skills and attitudes vital to the career professional Air Force Officer. Emphasis is placed on qualities of leadership and other attributes essential to progressive advancement into positions of increasing responsibility as commissioned officers in the Air Force.

Full-time students who have two years remaining toward a baccalaureate or graduate degree are eligible to enter the program. Each student must meet physical and mental standards set by the Air Force. Candidates must complete six weeks of Field Training, conducted by the Air Force at designated bases, during the summer preceding enrollment into the program. A student must have and maintain a quality-point index of 2.00 or its equivalent. Applications must be made *early* in the academic year prior to the one of enrollment in the program, so that all qualification criteria may be met in time for selection consideration in the spring.

The program is offered at Catholic University. At the time of enrollment, a registration fee must be paid. There is no tuition charge. Students in the program receive a monthly retainer fee of $50. Uniforms and textbooks are furnished without cost. Students participating in the Field Training phase are paid at a rate established by the U.S. Government and are also furnished travel to and from the Field Training base.

Interested students should consult the Department of Aerospace Studies, Catholic University of America, Washington, D.C. 20017.

University Computer Center

THE UNIVERSITY COMPUTER CENTER is located on the first floor of Stuart Hall, 2013 G Street, N.W. The facilities of the Center are available for academic purposes to all registered students and to members of the instructional staff. The Center has as its principal mission the provision of a powerful computing system which serves the University in its educational and research endeavors. The Center's programming staff concentrates its efforts in conducting faculty and staff seminars, consulting with users in the preparation of complicated programs, and carrying out computer-oriented research.

The Computer Center equipment consists of an IBM system 360 Model 50 computer with 256,000 positions of core storage, a 2314-disk storage unit providing on-line storage for more than 200 million characters, a card read/punch, a high speed line printer, and four tape drives. The principal languages available to the user are FORTRAN IV, COBOL, Programming Lan-

guage One (PL/I), Assembler Language, and ALGOL. In addition, numerous utility, statistical, data manipulation, and simulation systems and special languages are available in the library of programs. Facilities are available on a first-come, first-served basis for preparation of programs and data.

Computer programming courses are offered by the School of Government and Business Administration, the Department of Statistics, and the School of Engineering and Applied Science. In addition, many other departments offer courses that utilize the computer as a research adjunct to course work.

The Computer Center is open 24 hours a day from 8 a.m. Monday to 4 p.m. Saturday.

The Speech and Hearing Clinic

THE SPEECH AND HEARING CLINIC offers diagnostic and remedial work for children and adults with such communication difficulties as stuttering, lisping, cleft palate speech, cerebral-palsied speech, and voice, articulatory, and hearing problems. Diagnostic and remedial work is also available for persons with nonstandard language usage due to such conditions as hearing loss, brain damage, mental retardation, and environmental factors.

Fees.—The fee for an initial evaluation is $20. Fees for additional specialized testing are dependent on the testing involved. The fees for individual speech or hearing therapy range from $3 to $10 a session. Fees are reduced for full-time students enrolled in the University and for persons receiving group therapy. Fees are payable at the Office of the Cashier.

The Reading Center

THE READING CENTER offers individual diagnostic and corrective services for all levels: primary, elementary, secondary, and adult. In addition, special reading improvement classes are conducted for high school and college students as well as other adults.

A complete diagnosis includes psychological tests; vision, hearing, dominance, and spelling tests; and various types of reading achievement and aptitude tests. Results are interpreted, and a written report is presented in conference with the parents or the individual.

The special reading improvement classes for high school students, college students, and other adults are offered throughout the year at stated intervals. Emphasis is placed on improvement of vocabulary, speed, comprehension, and study skills. Instruction in spelling is also provided as needed. Mechanical aids such as the tachistoscope, rate accelerator, and controlled reader are available for increasing speed of comprehension.

Fees.—The fee for individual diagnosis is $60; for individual instruction, $6 a lesson; for semi-individual instruction, $6 a lesson; for instruction in small groups with common reading difficulties, $5 a lesson. Fees are reduced for full-time students currently enrolled in George Washington University. All fees are payable in advance at the Office of the Cashier.

Veterans Education

THE OFFICE OF THE REGISTRAR assists students entitled to educational benefits as veterans or war orphans with any problems which may arise concerning their benefits. This Office also processes certification of enrollment and attendance to the Veterans Administration so that monthly allowances will be paid.

When feasible, students entitled to benefits as veterans or war orphans should consult the Office of the Registrar prior to submitting application to the Veterans Administration. All such students should obtain the instruction sheet issued by the Office of the Registrar, which sets forth requirements to be fulfilled before certification of enrollment can be made to the Veterans Administration, and which includes other information of general interest.

The Veterans Administration is at 2033 M Street, N.W., Washington, D.C. 20421.

Alumni Associations

THE GENERAL ALUMNI ASSOCIATION

THE OBJECTIVES OF THIS ASSOCIATION are to unite the graduates who wish to associate themselves for charitable, educational, literary, and scientific purposes, and to promote the general welfare of the University.

Eligible members are those who have matriculated in any school of the University and who have left the University in good standing, or any person who is or has been a member of the teaching, research, or administrative staff of the University, or of the Board of Trustees of the University. Active members are those eligible members who are current contributors (dues or otherwise) to or life members of The George Washington University General Alumni Association, the Alumni Association of any school of the University, or contributors to the George Washington University Fund.

The Alumni Office is in Bacon Hall, 2000 H Street, N.W., Washington, D.C. 20006.

All alumni are urged to keep the Alumni Office informed of changes of address or occupation and to supply information with regard to their fellow alumni.

THE ENGINEER ALUMNI ASSOCIATION OF THE GEORGE WASHINGTON UNIVERSITY, INC.

The Engineer Alumni Association was organized in 1936 and incorporated in 1963 to coordinate with the General Alumni Association those activities of primary interest to the engineering alumnus. The objectives of the Association are to provide the link between the graduates and Faculty of the School, to help promote the general welfare of the School of Engineering and Applied Science and of the University, to foster activities of the engineering organizations recognized by the University, and to advance the engineering profession in general.

In 1966 a board of directors, comprised of fifteen elected members of the Association and the Engineers' representatives serving on the Governing Board of the General Alumni Association, was established. The membership

of the board of directors was expanded in 1969 to include the Director of Alumni Relations and one representative each from the Faculty of the School and the student body. Five members of the Association are elected each year prior to the June meeting, to three-year board memberships as listed below:

Term Expiring 1971
Solomon Fineblum
Raymond P. Morales
Arthur E. Proctor
Edwin O. Stengard
Edward A. Wareham III

Term Expiring 1972
John L. Wolfgang, Jr.
Douglas L. Jones
John R. Manning
Delmer C. Ports
Elmer W. Whitlock, Jr.

Term Expiring 1973
Dulaney de Butts
Matthew Flato
William H. Holt
James A. Sinsabaugh
H. Moffette Tharpe, Jr.

General Alumni Association Representatives
Laurence R. Brown
William H. Holt
Edward A. Wareham III

Director of Alumni Relations
Ellwood A. Smith

Faculty Representative
Nozer D. Singpurwalla

Student Representative
Donald Wallroth

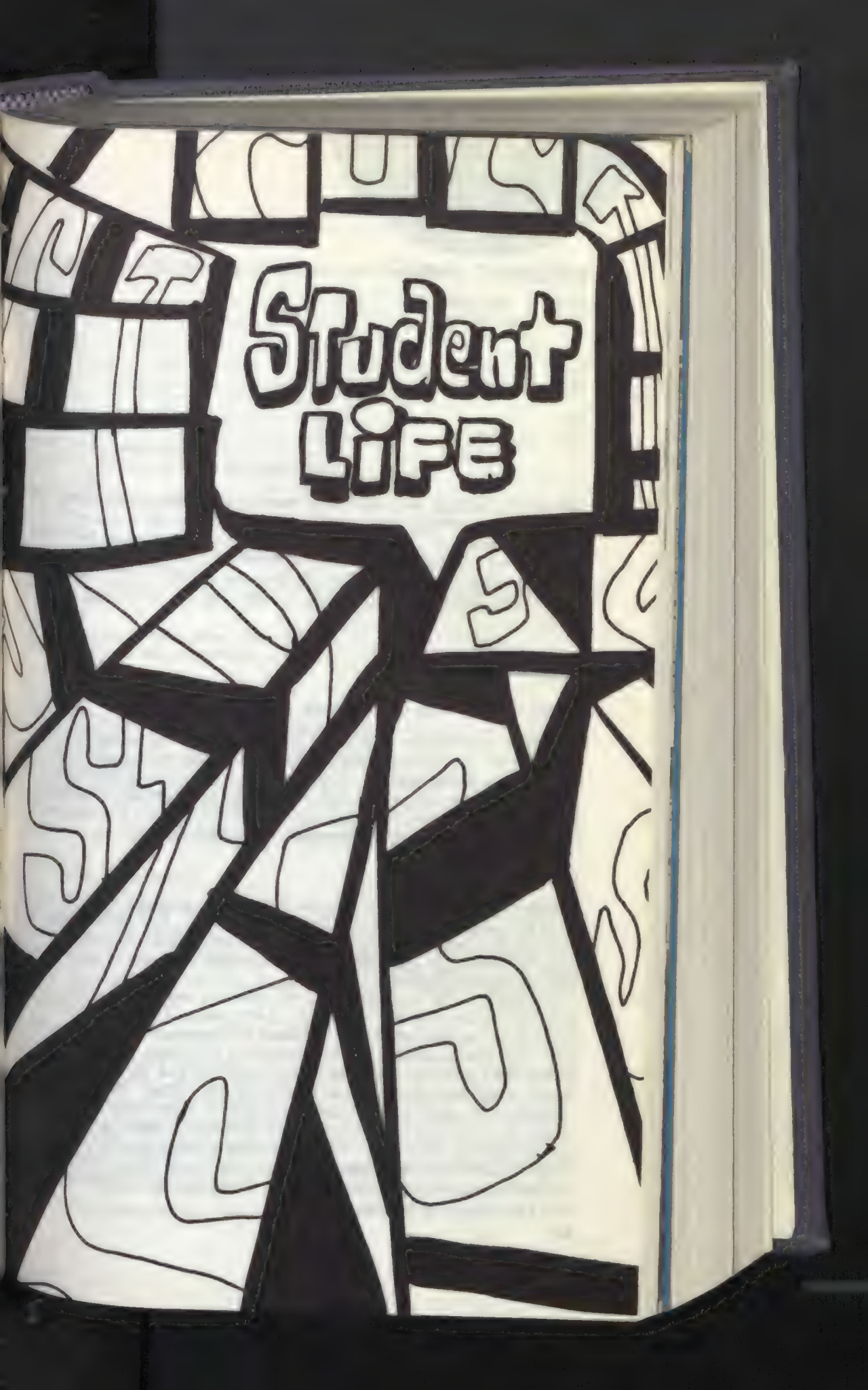
At the June meeting each year the board elects officers for its operation during the upcoming year. The officers for the year 1970–71 are:

President.—Douglas L. Jones, B.M.E. 1963, M.S. in Engr. 1965, D.Sc. 197
200 N. Adams Street, Apt. 232, Arlington, Va. 22201

Vice President.—Arthur E. Proctor, B.E.E. 1953; 10523 Pinewood Court
Adelphi, Md. 20783

Secretary.—John L. Wolfgang, Jr., B.E.E. 1962, M.S. in Engr. 1967; 56
54th Road, Apt. 411, Riverdale, Md. 20840

Treasurer.—John R. Manning, B.S. in Engr. 1957, J.D. 1961; 2774 N. Wal
field Street, Arlington, Va. 22207


Student
LIFE

STUDENT LIFE

THE OFFICE OF THE VICE PRESIDENT FOR STUDENT AFFAIRS develops Stude
Life programs, policies, and procedures to complement the University's form
instruction program. These activities are implemented through the offices o
the Dean of Students, Educational Opportunity Program, Housing, Interna
tional Students, Student Activities, Student and Alumni Career Services, Stu
dent Health Services, the University Center, and the University Counseli
Center.

STUDENT SERVICES

OFFICE OF THE DEAN OF STUDENTS

The Office of the Dean of Students provides general counseling and informa
tion services to individual students. In addition, the staff of this Office is re
sponsible for counseling and other programs within the residence halls. Th
Dean of Students also works with the Adviser to International Students, th
Counselor and Coordinator of the Educational Opportunity Program, and the
Director of Housing in the implementation of their programs.

HOUSING

Complete information concerning the University's residence halls is available
from the Director of Housing, George Washington University, Washington
D.C. 20006. Information concerning off-campus housing near the Universi
may be obtained at this Office. The reservation of rooms in private house
must be made by students.

Admission to the University does not include a room reservation. The stu
dent will receive, with his notification of acceptance, University residence ha
information, an application for residence hall space, a medical examinatio
form, and a declaration of intent to attend the University. The medical exam
ination form must be completed by the applicant and his physician and re
turned to the University Student Health Services Office. The application for
residence hall space must be accompanied by a $100 *nonrefundable* deposi
($200 for applicants admitted by early decision). Early decision students
must submit the deposit by January 15. The housing deposit is credited to
ward the semester's room charge. Rooms are leased for the academic yea
and lease payment must be made by July 15 for the fall semester and Decem
ber 15 for the spring semester.

1971–72 Residence Hall Rates per Person for Two Semesters*

	Room and Food Service	*Room Only*
For Men:		
Adams Hall		
double room	$1,310	$700
triple room	1,260	650
Calhoun Hall		
double room	1,335	725
triple room	1,285	675
Crawford Hall—double room	1,285	675
Madison Hall (graduate students and upperclassmen)		
double room	1,335	725
Mitchell Hall—single room	1,385	775
For Women:		
Graduate Women's Residence—apartment for three	——	775
Strong Hall (upperclass women)		
single room	1,385	775
double room	1,335	725
Thurston Hall		
double room, triple room, large room for four	1,335	——
smaller room for four, suite for six	1,285	——

FOOD SERVICE

Residents of Thurston Hall and all resident freshmen are required to participate in the food service plan. The plan is optional for all other residents. Well-balanced meals are served cafeteria style five days a week (15 meals). Food service payment does not cover University holidays or vacation periods. All meal cards admit bearer to the dining room in Thurston Hall and Mitchell Hall. Residents of Calhoun, Crawford, Madison, and Strong halls are given preference for the use of the dining room in the University Center.

MUNSON HALL APARTMENTS

Munson Hall is a University-owned and operated apartment house containing 15 one-bedroom and 54 efficiency apartments. Graduate and married students are given priority for residency until July 15 each year. Seniors and juniors who have lived at least one year in University residence halls will be considered for residency after that date if space is available. All leases are for one 12-month year.

UNIVERSITY COUNSELING CENTER

The George Washington University Counseling Center provides services designed to assist students with educational, social, and personal problems. These services help the individual to evaluate his educational, personal, and social life. Services of the Center include behavior therapy; individual and group counseling; diagnosis of academic difficulties; and the provision of remedial measures such as study habits instruction (individual and group), programmed instruction, and the referral of students seeking help to qualified outside agencies.

*Rates and food service plan subject to change.

The Counseling Center also provides special assessment services in coope tion with the School of Engineering and Applied Science, the Office of Adm sions, and other educational institutions.

Fees.—For students who are currently registered as degree candidates in t University, the fee is $20; for students currently enrolled in the University b not as degree candidates, the fee is $60; for graduates of the University, $6 for community clients, $85. Fees for specialized testing are dependent up the services involved. All fees are payable at the Counseling Center Office.

INTERNATIONAL STUDENTS

International House is the campus center for students from foreign countri It serves also as the headquarters of the International Students' Society whi seeks to promote international friendship and understanding by welcoming its membership students from all countries, including those from the Unit States.

The Adviser to International Students has his Office in International Hou and is available each day throughout the school week for consultation on m migration regulations and on any matters concerning the social and academ welfare of the foreign student.

UNIVERSITY CENTER

The term University Center encompasses a building, an organization, and program. The building is the University's center for community life. It is th physical instrument for implementation of the programs and objectives of th organization.

The organization, composed of students, faculty, administrators, and alumn in the form of a three-board structure, provides an informal education mediu for individual and group activities adapted to the leisure-time interests an needs of the University community. It also provides training for those direct involved in management of and programming for the Center.

The primary purpose of the George Washington University Center is th continuing development of a broad cultural, intellectual, social, and recreation program. Its secondary purpose is the provision of its various services an facilities to the campus community for the development of community life.

The Center houses a wide range of facilities to serve the needs of the cam pus, including dining rooms and a rathskeller, a bookstore, lounges and stud areas, a theater, bowling lanes and a billiard room, a University Club, student organization offices and workrooms, meeting and conference rooms, an infor mation center, music listening rooms, social areas, shower and dressing rooms lockers, and parking accommodations.

STUDENT HEALTH SERVICES

The Student Health Service is an outpatient clinic designed to assist all regis tered students with their health needs while attending the University. The service, located at 935 22nd Street, N.W. (in the University Clinic building), assists with health conditions and medical emergencies by advice and treat ment, proper referral when necessary, and cooperation with other physicians and medical facilities.

During the academic year, the hours are 9 a.m. to 10 p.m., Monday through Friday, and 9 a.m. to 12 noon on Saturday. The weekday hours during the summer sessions are from 9 a.m. to 9 p.m.; Saturday hours are 9 a.m. to 12 noon. A physician is in attendance during these hours.

For serious illnesses or emergencies that occur when the Student Health Service is closed, students may call the Medical Bureau (223-2200), or go to the Emergency Room of the University Hospital for treatment. Charges for both of these services are solely the responsibility of the student.

Charges for services that are not available through the Student Health Service, such as X-ray and laboratory tests, specialty services, and consultations, etc., must be paid by the student.

The Student Health Service is available only to those students who are currently enrolled in the University. A student who is not currently enrolled, or one who has severed his connection with the University, is ineligible for this service. This service is not available between the last day of examinations for a semester or summer session and the completion of registration for the next semester or summer session.

A student intending to train for an athletic team is required to pass a medical examination. The University is not responsible for injuries received in intercollegiate or intramural games, or in any of the activities of the Department of Physical Education.

HEALTH AND ACCIDENT INSURANCE

In addition to the above service, the Student Health Service has arranged for Health and Accident Insurance, on an elective basis, for *full-time* students. Arrangements for insurance coverage are the responsibility of the student. The University assists in the subscription process by administering application cards and collecting fees during official registration periods.

A student may subscribe and pay for the coverage *only* when he pays his tuition and other fees at registration. For those few students who register late, the subscription will be available during official late registration. *Subscription during late registration will not be available for those students who previously registered and failed to subscribe at that time.* Students who participate in the Summer Advanced Registration Program must subscribe and pay for the coverage on the appropriate date of the Summer Advanced Registration. Students who participate in the pre-registration, conducted in April for the following Fall Semester, must subscribe for the coverage at the time of pre-registration in April. The fee will be included with the tuition bill and must be paid by August 1.

The fee charged and the coverage provided are effective, with minor variations (see available folder), whether at the University, at home, or elsewhere, on a 6-month basis—September through February for those subscribing for the fall, and March through August for those subscribing for the spring. The fee charged at each official registration period will be the payment required for the coverage for a 6-month period and must be paid in full at the time of subscription.

The policy contract is between the individual and the insurance carrier and is accepted at any hospital or emergency room that accepts this type of medical coverage. Details of the policy are contained in a folder available at the Student Health Service Office.

STUDENT AND ALUMNI CAREER SERVICES OFFICE

The Student and Alumni Career Services Office, Woodhull House, 2033 G Street, N.W., provides assistance to degree-seeking students and alumni seeking full-time, part-time, temporary, or permanent employment.

The Office maintains a registry of positions available in many fields, both locally and nationally, and refers qualified applicants for consideration. The Office administers the On-campus Industrial and Government Recruitment Interview Program for seniors and graduate students, in which private companies, government agencies, service organizations, public school systems, and universities participate. The Office also handles the referral and placement functions of the on-campus College Work-Study Program. Prospective teachers may establish permanent credentials files in the Student and Alumni Career Services Office. This service includes files for alumni seeking college and university faculty and administrative positions. The Office also provides individual interviews for students and alumni wishing career guidance.

RELIGIOUS LIFE

The University recognizes the contribution that religion makes to the life of its students and encourages them to participate in the various religious organizations of their own choice. Catholic, Jewish, and Protestant bodies sponsor various groups and form a link between the University and the religious community. The advisers of the religious organizations are available for counseling.

Religious services in various traditions are provided regularly for the University community as announced.

DAVIS-HODGKINS HOUSE

The Davis-Hodgkins House is the student center of the School of Engineering and Applied Science, providing lounges, reading rooms, and student organization offices. The House provides convenient, comfortable facilities for the exchange of ideas and good fellowship.

STUDENT ACTIVITIES

The offices of the Vice President for Student Affairs, the Dean of Students, and the Director of the University Center are responsible for all co-curricular phases of student life.

STUDENT ACTIVITIES OFFICE

The Student Activities Office, located on the fourth floor of the University Center, is a service of the division of Student Affairs. It seeks to facilitate all phases of student activity; to maximize the opportunities for direct involvement of students in co-curricular experiences and to locate and utilize community and University resources for programs of mutual benefit to students and the community. The staff assists student organizations in leadership training, programming, and community service projects. The Office also serves as an information center for publicizing the University master activities calendar; for registering and cataloguing campus organizations; for scheduling events an-

facilities; and for aiding communication between campus organizations. Students interested in participating in any phase of University life, including social, cultural, community, or academic programming, should acquaint themselves with the staff, services, and functions of the Office.

STUDENT GOVERNMENT

The University believes in encouraging the development of responsibility and leadership in students by providing various avenues of expression within its governmental structure. Whether in residence hall governments, faculty-student policy committees, school councils, or University Center boards, the opportunity for student participation in University decision-making and policy implementation is both substantial and varied. Student government, with the advice and counsel of offices of the Division of Student Affairs, reinforces the educative process through practical living experience.

Joint Committee of Faculty and Students.—This Committee is officially charged with facilitating all efforts to improve student-faculty relations, with encouraging student recommendations in all areas of Faculty Senate policy formulation which affect student life, and with recommending changes in the rules and regulations governing the conduct of student life. The Committee has specific advisory powers in any area concerning student-faculty relations or the interests of the student body.

Hearing Committee on Student Affairs.—The University Hearing Committee of Student Affairs hears and decides all cases arising under the rules and regulations of the University governing student conduct. It also hears and decides cases arising under the rules and regulations of student governmental bodies and student organizations. Its decisions take the form of advice to the President of the University as to what action may be deemed appropriate in such cases.

The Hearing Committee has appellate jurisdiction in all cases first heard before student organizations empowered to conduct regulatory hearings, with authority to reverse the findings and judicial actions taken by those bodies. The Hearing Committee has original jurisdiction in those cases in which one or more of the aforementioned bodies is a party to the case, or whenever one of the aforementioned bodies yields its own original jurisdiction. The Committee's original jurisdiction also extends to cases arising under the Human Relations Act and under the regulations adopted by the University for the preservation of academic freedom.

Membership is comprised of 6 students and 6 members of the faculty, all appointed by the President. Meetings are held monthly. Due process is guaranteed in all cases.

UNIVERSITY CENTER GOVERNMENT

The University Center Governing Board is designed to advise upon and evaluate the overall administration of the Center, subject to the authority of the Board of Trustees, as delegated to the President of the University. Membership consists of 7 students, 4 faculty, 2 administrators, and one alumni representative.

The University Center Operations Board, concerned with the policies related to the daily operation of the Center, works coordinately with the professional

staff and within the framework of broad policies established by the Ce
Governing Board. The Board consists of 11 student members. Its prim
objective is to make the Center facilities as accessible, useful, and enjoyabl
possible for all members of the University community.

Through its committee structure, the Program Board of the University C
ter provides for a variety of cultural, intellectual, social, and recreational p
grams on campus. The Program Board consists of 13 students.

The control and administration of all student activities are outlined in *The S
dent Handbook*.

THE ENGINEERS' COUNCIL

The Engineers' Council is the student governing body for the School of En
neering and Applied Science, composed of elected representatives from ea
level class and from the graduate student body, from each student organizat
in the School, the Business Manager of the *Mechelecіv*, and the House M
ager of the Davis-Hodgkins House. The purpose of the Council is to prov
liaison between the student body of the School and the Faculty, Administ
tion, and Student Government of the University in all matters affecting t
general interests and welfare of the student body, the School, or the Univ
sity. The Council is maintained financially by the Engineers' Council fee p
by each student in the School, and sponsors the engineers' student magazi
Mechelecіv; the Engineers' Mixers; Engineers' Ball; and the Annual Christm
Tree Ceremony in the University Yard. Council meetings are open to all s
dents in the School.

The Council acts as the directing body for *Mechelecіv*, which is publish
six times a year and is free to all students in the School. This magazine
cludes campus and alumni news, a calendar of events, news of the stude
organizations, and articles on engineering by students and faculty membe
The magazine is published by a student Board of Editors and a volunteer s
dent staff.

SPORTS

The University is a member of the National Collegiate Athletic Associatio
Its teams participate in intercollegiate contests in basketball, baseball, tenn
golf, rifle, soccer, wrestling, and crew.

The University offers a broad program of extramural and intramural spor
activities for both men and women through the Department of Physical Ed
cation.

PERFORMING ARTS

Students may participate in dance, drama, forensics, music, and radio broa
casting through the following organizations: Enosinian Debating Society
George Washington University Dance Company; Station WRGW; Universi
Chamber Choir, Chorus, Orchestra; and University Players. Each of thes
groups presents programs during the academic year.

With the cooperation of the Curator of Art, an annual student art exhibit i
presented.

MAJOR PROGRAM EVENTS

Recreation Program.—The University Center Program Board and the Department of Physical Education arrange dances, movies, and trips at frequent intervals for all students.

Pop Concert Program.—The University Center Program Board sponsors a concert each semester at which nationally known entertainers perform.

Orchestra Series.—The University Orchestra offers a series of concerts throughout the academic year.

University Concert Series.—The Department of Music offers a series of concerts throughout the academic year.

Art Exhibits.—The work of locally, nationally, and internationally known artists is shown in monthly exhibits in the Dimock Gallery in Lisner Lounge and the art gallery of the University Center.

Winter Weekend.—Scheduled in the latter part of the fall semester, Winter Weekend includes Homecoming activities, theater productions, a carnival, and athletic events.

Religion in Life Program.—Special emphasis is given to the place of religion in contemporary society in this program of events during the fall and spring semesters.

Spring Weekend.—This is the traditional time for the award of honors in student activities. Mortar Board and Omicron Delta Kappa announce and present their new members. Activities also include concerts and a cruise on the Potomac.

STUDENT ORGANIZATIONS

HONOR SOCIETIES

Sigma Xi.—A national scientific honor society, the purpose of which is to encourage original investigation in science, pure and applied. Outstanding graduate students in the sciences are eligible for full membership, and undergraduates who have shown marked ability in research may be elected to associate membership.

Alpha Lambda Delta.—A national fraternity established to encourage and reward high scholarship and attainment, membership in which is limited to those freshman women who attain a scholastic average of at least 3.50.

Delphi.—An intersorority honorary society.

Delta Sigma Rho-Tau Kappa Alpha.—A national forensic society.

Gate and Key.—An interfraternity honorary society.

Mortar Board.—A national society for senior college women, stressing leadership, scholarship, and service.

Omicron Delta Kappa.—A national fraternity emphasizing leadership in extracurricular activities.

Order of Scarlet.—A service honorary society for sophomore and junior men.

Phi Eta Sigma.—A national fraternity, established to encourage and reward high scholarship and attainment, membership in which is limited to those freshmen men who attain a scholastic average of at least 3.50.

Sigma Tau.—A national engineering honorary fraternity, the purpose of which is to recognize scholarship and professional attainment.

Tassels.—A service honorary society for sophomore women.

Tau Beta Pi.—A national engineering honorary fraternity, the purpose of which is to recognize distinguished scholarship and exemplary character.

PROFESSIONAL ORGANIZATIONS

American Society of Civil Engineers (Student Chapter).
American Society of Mechanical Engineers (Student Chapter).
Institute of Electrical and Electronic Engineers (Student Chapter).
Society for the Advancement of Management.—Membership limited to students in engineering and public or business administration.
Theta Tau (Gamma Beta Chapter).—A national professional (engineering) fraternity. Membership by invitation to outstanding students who have completed successfully at least the first year in the School of Engineering and Applied Science.

SOCIAL FRATERNITIES

Delta Tau Delta, Kappa Sigma, Phi Sigma Delta, Sigma Alpha Epsilon, Sigma Alpha Mu, Sigma Chi, Sigma Nu, Sigma Phi Epsilon, Tau Kappa Epsilon.

SOCIAL SORORITIES

Delta Gamma, Delta Phi Epsilon, Kappa Alpha Theta, Kappa Kappa Gamma, Phi Sigma Sigma, Sigma Delta Tau.

STUDENT PUBLICATIONS

Academic Forum (student-faculty journal), *The Cherry Tree* (the annual), *The University Hatchet* (semi-weekly newspaper), *Mecheleciv* (engineers' publication), *The Rock Creek* (literary magazine), *Student Directory.*

RELIGIOUS ORGANIZATIONS

Baptist Student Union, B'nai B'rith Hillel Foundation, Christian Science Organization, Eastern Orthodox Club, Episcopal Student Association, Lutheran Student Association, Newman Club, Unitarian-Universalist Club, United Christian Fellowship, Wesley Foundation, and a Religious Council comprised of representatives of all religious organizations.

OTHER ORGANIZATIONS

Alpha Phi Omega (national service fraternity), Alpha Theta Nu (scholarship winners), Amateur Radio Club, Big Sisters, Black People's Union, Caravansary International, Inc., Cheerleaders, Chess Club, Colonial Boosters, Colonial Sk Club, Commission on Model Government, Community Relations Committee, Cricket Club, Free University, Hostel Club, Indian Cultural Association, International Students' Society, Intersorority Athletic Board, Joint Food Service Board, Old Men, Organization of Arab Students, Panhellenic Association, Pep Band, Rappel Club, Residence Hall councils, St. Elizabeths Project, Share, Sk diving Club, Station WRGW, Student Community Alliance, Student Grotto of the National Speleogical Society, Student International Meditation Society, Vietnamese Club, Young Americans for Freedom, Young Democrats Club, Young Hegelian Society, Young Republican Club, Young Socialist Alliance.

THE UNIVERSITY

HISTORY AND ORGANIZATION

THE GEORGE WASHINGTON UNIVERSITY had its beginning in 1821 as The Columbian College in the District of Columbia. The name of the institution was changed in 1873 to Columbian University and in 1904 to The George Washington University. The debt of the University to George Washington whose name it bears is an intangible one.

George Washington, as President and as private citizen, had urgently insisted upon the establishment of a National University in the Federal City. There he hoped that, while being instructed in the arts and sciences, students from all parts of the country would acquire the habits of good citizenship, throwing off local prejudices and gaining at first hand a knowledge of the practice, as well as the theory, of republican government. To further the materialization of his hopes, Washington left a bequest of fifty shares of The Potomac Company "towards the endowment of a University to be established within the limits of the District of Columbia, under the auspices of the General Government, if that government should incline to extend a fostering hand towards it." The Congress never extended "a fostering hand." The Potomac Company passed out of existence, and Washington's bequest became worthless.

Fully conscious of Washington's hopes, but motivated primarily by a great missionary urge and the need for a learned clergy, a group of dedicated ministers and laymen sponsored a movement for the establishment of a college in the District of Columbia. Inspired largely by the zeal and energy of the Reverend Luther Rice, they raised funds for the purchase of a site and petitioned Congress for a charter. After much delay and amendment, Congress granted a charter which was approved by President Monroe on February 9, 1821. To safeguard the College's nonsectarian character it provided "that persons of every religious denomination shall be capable of being elected Trustees; nor shall any person, either as President, Professor, Tutor or pupil, be refused admittance into said College, or denied any of the privileges, immunities, or advantages thereof, for or on account of his sentiments in matters of religion." During the entire time when the institution was known as Columbian College, activities were centered on College Hill, a tract of forty-six and a half acres between the present Fourteenth and Fifteenth Streets and extending north from Florida Avenue to somewhat beyond Columbia Road. The Medical School was located downtown. For the better part of the Columbian University period,

the buildings of the University were situated along H Street between Thirteenth and Fifteenth Streets. The Medical School group still remains there.

During the last half century the University's present plant has been developed in that section of the old First Ward familiarly known as "Foggy Bottom," between Nineteenth and Twenty-fourth Streets, south of Pennsylvania Avenue. Within a few squares are the White House, the Department of the Interior, the State Department, the World Bank, and many other government offices and international agencies. The area is not without its reminders of historic interest to the University. President Monroe, who signed the Charter, lived at 2017 E Street. The first President of the Board of Trustees, the Reverend Obadiah B. Brown, was for fifty years the pastor of a church at Nineteenth and Eye Streets, and Washington selected Twenty-third and E Streets as the site of the National University he hoped to see established.

The University as it is now organized consists of Columbian College of Arts and Sciences (undergraduate); the Graduate School of Arts and Sciences; the professional schools, which include the National Law Center and the schools of Medicine, Engineering and Applied Science, Education, Government and Business Administration, and Public and International Affairs; the College of General Studies; the Division of University Students; and the Summer Sessions.

The George Washington University is privately endowed and is governed by a self-perpetuating Board of Trustees of which the president is an ex officio member.

THE UNIVERSITY LIBRARIES

The Library collections of the University are housed in the University Library, the general library of the University, and in the departmental libraries of law and medicine.

These collections contain over 517,000 volumes—about 367,000 in the University Library, about 107,000 in the Law Library, and about 43,000 in the Medical Library. Approximately 30,000 volumes a year are added to the Library's resources. Endowments, supplementing the University appropriation, provide books in the fields of American civilization, American literature, foreign service, history, public finance, and the social sciences; and gifts from many sources have enriched the collections. The Libraries currently receive 4,500 periodicals.

Information concerning the use of the Libraries may be obtained at the Library service desks.

The Library is administered for the curricular, reference, and recreational needs and interests of the students. Instruction in the use of the library is given upon request by the reference librarians. The Library endeavors to assist students and all members of the University to use the rich library resources of Washington and the unusual opportunities they offer for extensive research. Interlibrary loan arrangements are maintained with other libraries in the District and in the United States.

The student has access to the Library of Congress, the Public Library of the District of Columbia and its branches, the libraries of the Pan American Union, the Bureau of Railway Economics, the U.S. Department of Agriculture, the Smithsonian Institution, the National Library of Medicine, and many of the other great special collections of the government departments. Full-time graduate students at George Washington University may, upon application at the

Office of the Director of Libraries, be issued a Consortium library card which permits direct borrowing from the libraries of the other Consortium institutions.

Except during the summer intersession and vacation periods, the hours of the University Library are Monday through Friday, 8:30 a.m. to 12:00 midnight; Saturday, 9:00 a.m. to 10:00 p.m.; Sunday, 1:00 p.m. to 12:00 midnight.

THE BOARD OF TRUSTEES 1970–1971

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Carlton D. Smith
Charles E. Smith
Douglas Rathbone Smith, B.S.C.
Mark Sullivan, Jr., B.A.

[a]Nominated by the Alumni.

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John Johnston Wilson, LL.B.
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James Otis Wright, B.S., J.D.

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Alexander Wetmore, Ph.D., Sc.D.
Lloyd Bennett Wilson

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Joseph Young Ruth, B.A., *Director of Admissions*

* Nominated by the Alumni

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE

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Galip Mehmet Arkilic, Ph.D., *Acting Assistant Dean of the School of Engineering and Applied Science*

Alfred Martin Freudenthal, D.Sc., *Acting Chairman of the Department of Civil, Mechanical, and Environmental Engineering; Director of the Institute for the Study of Fatigue, Fracture, and Structural Reliability*

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Neil Emerson Mansfield, B.S. in E.E., *Director of the Continuing Engineering Education Program*

Charles Donald Brown, B.S., *Continuing Engineering Education Officer*

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Neil Scot Mannion, B.A., *Director of Engineering Admissions*

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THE PURPOSES of the Advisory Council for the School of Engineering and Applied Science are to strengthen communication between the School and the other colleges, schools, and divisions of the University as well as between the School and the University's Board of Trustees; to advise on the programs of instruction, research, and service in the School and to help interpret these programs to the community and the Nation; and to stimulate support for the continued development of the School and its programs.

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Alfred M. Freudenthal, *Acting Chairman, Department of Civil, Mechanical and Environmental Engineering*
Eugene G. Fubini, *Engineering Consultant*
Martin Goland, *President, Southwest Research Institute*
Donald Gross, *Associate Professor of Engineering and Applied Science*
William J. Harris, Jr., *Vice President, Research and Test Department, Association of American Railroads*
Walter R. Hibbard, Jr., *Vice President, Research and Development, Owens Corning Fiberglas Corporation*
William Holt, *Partner, Diller, Brown, Ramik & Holt*
Bernard A. Schriever, General USAF (Ret.), *Chairman of the Board, Schriever & McKee Associates, Inc.*
Arthur W. Sloan, *Chief Executive Officer, Susquehanna Corporation*
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Edward G. Uhl, *President, Fairchild-Hiller Corporation*
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* The President of the University, the Vice President for Academic Affairs, and the Dean of the School of Engineering and Applied Science are ex officio members of the Advisory Council.

Ernst Weber, *Chairman Designate, Division of Engineering, National Research Council*
Harold A. Wheeler, *Chief Scientist, Wheeler Laboratories, Inc.*
James F. Young, *Vice President—Engineering, General Electric Company*
L.A. Zadeh, *Chairman, Department of Electrical Engineering and Computer Sciences, University of California, Berkeley*

Faculty and Staff of Instruction*

EMERITUS

Benjamin Carpenter Cruickshanks, *Professor Emeritus of Mechanical Engineering*
B.S. in M.E. 1920, George Washington University

ACTIVE

Abd-elfattah Abd-alla, *Assistant Professor of Engineering and Applied Science*
B.S. 1960, Ain Shams University, Egypt; M.S. 1963, Alexandria University, Egypt; Ph.D. 1969, University of Maryland

Melvin Dayne Aldrich, *Assistant Professorial Lecturer in Engineering*
B.S. 1963, West Virginia University; M.S. 1965, D.Sc. 1968, University of Virginia

Charles Anello, *Associate Professorial Lecturer in Engineering*
B.S. 1958, Towson State College; M.S. 1962, D.Sc. 1964, Johns Hopkins University

Galip Mehmet Arkilic, *Professor of Applied Science; Acting Assistant Dean of the School of Engineering and Applied Science*
B.M.E. 1946, Cornell University; M.S. 1947, Illinois Institute of Technology; Ph.D. 1954, Northwestern University

Donald Oliver Baechler, *Assistant Professorial Lecturer in Engineering*
B.E.E. 1960, M.S. in Engr. 1964, George Washington University

Constantine Balanis, *Assistant Professorial Lecturer in Engineering*
B.S. in E.E. 1964, Virginia Polytechnic Institute; M.E.E. 1966, University of Virginia

Richard Walker Barnwell, *Assistant Professorial Lecturer in Engineering*
B.S. 1961, M.S. 1962, Auburn University; Ph.D. 1968, Virginia Polytechnic Institute

Lewis Horrigan Blakey, *Assistant Professorial Lecturer in Engineering*
B.S. in C.E. 1954, University of Notre Dame; M.S. in Engr. 1962, George Washington University

Walter Bock, *Special Lecturer in Engineering*
B.A. 1962, Ripon College; M.S. 1964, Purdue University

Matthew Edward Brady, *Associate Professorial Lecturer in Engineering*
B.S. in E.E. 1945, University of Nebraska; M.Engr. 1959, University of California, Los Angeles

Edward Howard Braun, *Associate Professor of Engineering and Applied Science*
B.A. 1948, M.A. 1950, Columbia University

*Professors, Adjunct Professors, Associate Professors, Assistant Professors, and Instructors constitute the Faculty. The President of the University, the Vice President for Academic Affairs, the Registrar of the University, and the Director of Admissions of the University are ex officio members of the Faculty. This listing of the Faculty and Staff of Instruction is for the academic year 1970-71.

Miles Melvin Bruce, *Assistant Professorial Lecturer in Engineering*
B.S. 1962, Clemson University; M.S. 1965, University of Virginia

Robert Wayne Bublitz, *Associate Professorial Lecturer in Engineering*
B.S. 1962, M.S. 1963, Oklahoma State University

John Dennis Buckley, *Assistant Professorial Lecturer in Engineering*
B.S. 1950, St. Lawrence University; B.S. 1959, M.S. 1961, Clemson University; Ph.D. 1964, Iowa State University of Science and Technology

Mehmet Izzi Celebiler, *Assistant Professorial Lecturer in Engineering*
M.S. 1963, Istanbul Technical University, Turkey; Ph.D. 1968, University of Pennsylvania

Chao-Mei Chen, *Assistant Professor of Engineering*
B.S. 1947, National Central University, China; M.S. 1964, University of Maryland

Ming Hui Chen, *Assistant Professorial Lecturer in Engineering*
B.S. 1960, Cheng Kung University, Taiwan; M.S. 1962, Chiao Tung University, Taiwan; M.S. 1964, Utah State University; Ph.D. 1969, Polytechnic Institute of Brooklyn

Pi-Fuay Chen, *Assistant Professorial Lecturer in Engineering*
B.S. in E.E. 1956, Taipei Institute of Technology, Taiwan; M.S. in E.E. 1962, Virginia Polytechnic Institute; D.Sc. 1968, University of Virginia

Joseph Shih Wei Chi, *Associate Research Professor of Engineering and Applied Science*
B.S. 1960, Ph.D. 1965, University of London, England

John Mason Clark, *Associate Professorial Lecturer in Engineering*
B.E.E. 1956, M.S.E. 1958, Ph.D. 1966, University of Florida

James Kyle Cooper, *Assistant Professorial Lecturer in Engineering*
B.A. 1958, University of Kentucky; M.D. 1962, Vanderbilt University

Paul Arthur Crafton, *Professor of Engineering and Applied Science*
B.M.E. 1944, City College, New York; M.S. 1950, Ph.D. 1956, University of Maryland

William Fay Crosswell, *Professorial Lecturer in Engineering*
B.S. 1952, Virginia Military Institute; M.S. 1954, Air Force Institute of Technology

Jesse Cameron Denton, *Professorial Lecturer in Engineering*
B.S. 1948, Swarthmore College; M.S. 1949, California Institute of Technology; Ph.D. 1963, Texas A&M University

John Edward Duberg, *Adjunct Professor of Engineering*
B.S. 1938, Manhattan College; M.S. 1940, Virginia Polytechnic Institute; Ph.D. 1948, University of Illinois

John Eftis, *Associate Professor of Engineering and Applied Science*
B.C.E. 1952, City College, New York; M.S. in C.E. 1958, Columbia University; D.Sc. 1[illegible], George Washington University

Marvin Eisenberg, *Associate Professor of Engineering and Applied Science*
B.S. in E.E. 1953, University of Miami; M.S. in Engr. 1954, Ph.D. 1961, University of Florida

William Joseph English, *Assistant Professorial Lecturer in Engineering*
B.S. 1963, St. Vincent College; B.S. in E.E. 1964, M.S. in E.E. 1965, Ph.D. 1966, Carnegie Mellon University

Wayne Douglas Erickson, *Associate Professorial Lecturer in Engineering*
B.S. 1954, M.S. 1955, Michigan State University; M.S. 1958, D.Sc. 1962, Massachusetts Institute of Technology

James Edward Falk, *Associate Professorial Lecturer in Engineering*
B.E.E. 1960, University of Detroit; M.S. 1961, Ph.D. 1965, University of Michigan.

Gerald Farmer, *Assistant Professorial Lecturer in Engineering*
B.S. 1956, University of Wyoming; M.S. 1964, Ph.D. 1967, University of Wisconsin

Charles Feldman, *Adjunct Professor of Engineering*
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Joseph Peter Fennell, *Associate Professorial Lecturer in Engineering*
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Dr.Ing. (M.E.) 1931, Polytechnic Institute of Torino, Italy; Dr.Ing. (A.E.) 1933, University of Rome, Italy

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B.S. in C.E. 1949, M.S. in C.E. 1952, University of Washington

Robert William Fralich, *Associate Professorial Lecturer in Engineering*
B.Ae.E. 1947, University of Cincinnati; M.Ae.E. 1952, University of Virginia; Ph.D. 1963, Virginia Polytechnic Institute

Alfred Martin Freudenthal, *Professor of Civil and Materials Engineering*
C.E. 1929, D.Sc. 1930, Prague Institute of Technology, Czechoslovakia; M.S. 1930, Prague University, Czechoslovakia

Clifford Lynn Fricke, *Associate Professorial Lecturer in Engineering*
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Jeffrey Alan Friedhoffer, *Assistant Professorial Lecturer in Engineering*
B.E.E. 1963, M.E.E. 1965, Ph.D. 1968, University of Delaware

William Henry Fuhr, *Assistant Professorial Lecturer in Engineering*
B.S. in E.E. 1954, M.S. 1957, Tulane University of Louisiana

Robert Earle Fulton, *Professorial Lecturer in Engineering*
B.S. 1953, Auburn University; M.S. 1958, Ph.D. 1960, University of Illinois

L Edward Garrick, *Adjunct Professor of Engineering*
B.S. 1930, University of Chicago

Michael Paul Gaus, *Associate Professorial Lecturer in Engineering*
B.S. 1954, M.S. 1956, Ph.D. 1959, University of Illinois

Robert Norman Gold, *Associate Professorial Lecturer in Engineering*
B.A. 1951, B.S. 1953, M.S. 1954, University of Chicago

Jeffrey Archibald Gorman, *Assistant Professorial Lecturer in Engineering*
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Forest Klaire Harris, *Adjunct Professor of Engineering*
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B.S. in E.E. 1957, M.S. in E.E. 1962, Case Western Reserve University

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Harry Goodsell Hull, *Assistant Professorial Lecturer in Engineering*
B.S. 1964, Worcester Polytechnic Institute; M.S. 1966, Northeastern University

Raul Ricardo Hunziker, *Professorial Lecturer in Engineering*
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B.S. 1942, University of Maryland; M.S. 1960, Stevens Institute of Technology

Daniel Palmer Johnson, *Adjunct Professor of Engineering*
B.S. 1930, McPherson College; M.A. 1933, University of Kansas; Ph.D. 1939, University of Wisconsin

Kenneth Johnson, *Professor of Engineering Administration*
B.A. 1931, Indiana State University; Ph.D. 1937, Purdue University

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B.M.E. 1963, M.S. in Engr. 1965, D.Sc. 1970, George Washington University

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B.E.E. 1951, Cooper Union, M.E.E. 1954, D.E.E. 1960, Polytechnic Institute of Brooklyn

John Kaye, *Professor of Engineering and Applied Science*
B.S. in M.E. 1939, M.S. in M.E. 1948, California Institute of Technology

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Nicholas Kyriakopoulos, *Associate Professor of Engineering*
B.E.E. 1960, M.S. in Engr. 1963, D.Sc. 1968, George Washington University

Roger Henry Lang, *Assistant Professor of Engineering and Applied Science*
B.S. in E.E. 1962, M.S. in E.E. 1964, Ph.D. 1968, Polytechnic Institute of Brooklyn

Bhagawandas Pannalal Lathi, *Associate Professorial Lecturer in Engineering*
B.E. 1955, Poona University, India; M.S. 1957, University of Illinois; Ph.D. 1961, Stanford University

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B.M.E. 1960, George Washington University; Ph.D. 1966, Virginia Polytechnic Institute

Francis Scott LeBeau, *Assistant Professorial Lecturer in Engineering*
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Harold Liebowitz, *Professor of Engineering and Applied Science; Dean of the School of Engineering and Applied Science*
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Patrick John Martin, *Assistant Professorial Lecturer in Engineering*
B.S. 1962, Iona College; M.S. 1965, George Washington University

Warren Mason, *Research Professor of Engineering*
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* On leave of absence 1970–71.

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*Arnold Charles Meltzer, *Associate Professor of Engineering and Applied Science*
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Richard Eugene Merwin, *Assistant Professorial Lecturer in Engineering*
B.S. in E.E. 1943, Ph.D. 1965, University of Pennsylvania; M.S. in E.E. 1960, Syracuse University

Frederic Alan Miercort, *Associate Professorial Lecturer in Engineering*
B.S. 1959, Massachusetts Institute of Technology; M.A. 1959, Harvard University; M.S. 1962, University of Colorado; Ph.D. 1968, Stanford University

Herbert Francis Mitchell, Jr., *Assistant Professorial Lecturer in Engineering*
B.S. 1938, George Washington University; M.A. 1946, M.E.S. 1947, Ph.D. 1948, Harvard University

Maurice Morin, *Assistant Professorial Lecturer in Engineering*
B.S. 1955, Boston University

John Henry O'Hara, *Assistant Professorial Lecturer in Engineering*
B.S. 1960, University of Arizona; M.S. 1962, University of Pennsylvania; Ph.D. 1968, Catholic University of America

Walter Olstad, *Associate Professorial Lecturer in Engineering*
B.S. 1954, Brown University; M.S. 1958, Virginia Polytechnic Institute; Ph.D. 1967, Harvard University

Robert Perry, *Associate Professorial Lecturer in Engineering*
B.S. 1950, Pennsylvania State University; M.S. 1951, Purdue University

Charles Edward Pinkus, *Assistant Professor of Engineering Administration*
B.A., B.S. 1960, Rutgers University; M.S. 1962, Cornell University

Manuel Jack Queijo, *Associate Professorial Lecturer in Engineering*
B.S. 1944, Worcester Polytechnic Institute; M.S. 1954, University of Virginia; Ph.D. 1963, Virginia Polytechnic Institute

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B.S. 1943, City College, New York; M.S. 1950, Ph.D. 1957, University of Maryland

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Philip David Robers, *Assistant Professorial Lecturer in Engineering*
B.S. 1965, M.S. 1967, Washington University, Ph.D. 1968, Northwestern University

Joseph John Rocchio, Jr., *Assistant Professorial Lecturer in Engineering*
B.S., M.S. 1958, Massachusetts Institute of Technology; Ph.D. 1966, Harvard University

Derrill Conway Rohlfs, *Assistant Professorial Lecturer in Engineering*
B.E.E. 1955, M.S. in Engr. 1959, George Washington University

Louis Samuel Rotolo, *Associate Professorial Lecturer in Engineering*
B.S. in E.E. 1951, University of Michigan; M.E.A. 1961, George Washington University

Nils Salvesen, *Associate Professorial Lecturer in Engineering*
B.S.E. 1960, M.S.E. 1961, Ph.D. 1966, University of Michigan

Stephen Howard Sandler, *Lecturer in Engineering*
B.S. 1962, New York University; M.S. 1966, Polytechnic Institute of Brooklyn

Andrew Robert Saunders, *Assistant Professorial Lecturer in Engineering*
Diplom Chem.E. 1947, Technical University of Budapest, Hungary; Ph.D. 1959, University of Maryland

George Saxton, *Assistant Professorial Lecturer in Engineering*
B.E.E. 1965, George Washington University

Walter Carroll Scales, *Assistant Professorial Lecturer in Engineering*
B.S. (Communications) 1967, M.S. 1970, George Washington University

*On leave of absence 1970–71

Leonard Schuchman, *Associate Professorial Lecturer in Engineering*
B.B.A. 1957, B.E.E. 1960, City College, New York; M.S. 1962, Stanford University

Gerhard Schueller, *Assistant Professor of Civil Engineering*
Diplom-Ingenieur in C.E. 1967, Institute of Technology, Graz, Austria; Ph.D. 1970, Stanford University

Victor Selman, *Associate Professorial Lecturer in Engineering*
B.A. 1956, New York University; M.S. 1960, Stevens Institute of Technology; D.Sc. 1969, George Washington University

Bhupendraprasad Shah, *Assistant Professorial Lecturer in Engineering*
B.E. 1956, Baroda University, India; M.E. 1958, Indian Institute of Science, Bangalore, India; M.E.E. 1961, Syracuse University

Presson Scott Shane, *Professor of Engineering Administration*
B.S. in Ch.E. 1941, University of Kansas; M.S. 1946, Massachusetts Institute of Technology

George Walter Shelhorse, *Professorial Lecturer in Law*
J.D. 1951, George Washington University

Arnold Roy Shulman, *Associate Professorial Lecturer in Engineering*
B.E.E. 1948, New York University; M.S. in E.E. 1953, Newark College of Engineering

Nozer Darabsha Singpurwalla, *Associate Professor of Applied Science*
B.S. 1959, B.V. Bhoomraddi College of Engineering and Technology, Hubli, India; M.S. (I.E.) 1964, Rutgers University; Ph.D. 1968, New York University

Rosedith Sitgreaves, *Visiting Professor of Applied Science*
B.A. 1935, District of Columbia Teachers College; M.A. 1940, George Washington University; Ph.D. 1953, Columbia University

*Nicholas Arthur Sloan, *Assistant Professor of Engineering*
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†Herbert Ernest Smith, *Professor of Engineering and Applied Science*
B.S. 1930, C.E. 1932, City College, New York, M.S. 1936, Ph.D. 1940, New York University

Joseph Borden Smith, Jr., *Assistant Professor of Engineering and Applied Science*
B.S. in E.E. 1933, University of Florida; M.E.A. 1956, D.Sc. 1966, George Washington University

Arthur Sosslau, *Assistant Professorial Lecturer in Engineering*
B.S. in C.E. 1957, Polytechnic Institute of Brooklyn

Leo Douglas Staton, *Associate Professorial Lecturer in Engineering*
B.S. 1959, Ph.D. 1968, Virginia Polytechnic Institute

Iwao Sugai, *Assistant Professorial Lecturer in Engineering*
B.S.E. 1955, University of California, Los Angeles; M.S. in E.I. 1956, California Institute of Technology

Mauricio Thomae, *Assistant Professorial Lecturer in Engineering*
M.S. 1954, University of Buenos Aires, Brazil

‡Theodore George Toridis, *Associate Professor of Engineering and Applied Science*
B.S. 1954, Robert College, Turkey; M.S. 1961, Ph.D. 1964, Michigan State University

Joseph Anthony Travisano, *Assistant Professorial Lecturer in Engineering*
B.S. in E.E. 1966, University of Maryland

Alan John Truelove, *Associate Professorial Lecturer in Engineering*
B.A. 1956, Cambridge University, England; Ph.D. 1969, University of California, Los Angeles

Richard Van Blerkom, *Associate Professorial Lecturer in Engineering*
B.S. 1955, Lafayette College; M.A. 1956, Ph.D. 1959, Harvard University

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* On leave of absence 1970–71.

† On sabbatical leave 1970–71.

‡ On sabbatical leave fall semester 1970–71

Vallobh Vimolvanich, *Assistant Professor of Engineering*
B.E. 1963, Chulalongkorn University, Thailand; M.S. 1965, University of California, Berkeley; Ph.D. 1968, University of California, Davis

John Waller, *Associate Professorial Lecturer in Engineering*
B.S. 1959, Rockhurst College; M.S. 1962, Ph.D. 1966, University of Notre Dame

Carl Hugo Walther, *Professor of Engineering and Applied Science; Assistant Vice President for Academic Affairs*
B.E. 1931, M.C.E. 1933, Johns Hopkins University; Ph.D. 1967, University of Maryland

Shou-Ling Wang, *Associate Professorial Lecturer in Engineering*
B.S. 1946, St. John's University, China; M.E. 1948, Yale University; Ph.D. 1952, University of Illinois

Francis Earl Washer, *Professorial Lecturer in Engineering*
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Wasyl Wasylkiwskyj, *Associate Professorial Lecturer in Engineering*
B.E.E. 1957, City College, New York; M.S. in E.E. 1965, Ph.D. 1968, Polytechnic Institute of Brooklyn

Ernst Weber, *Adjunct Professor of Engineering and Applied Science*
Dipl. Engr. 1924, D.Sc. 1927, Technical University, Vienna, Austria; Ph.D. 1926, University of Vienna, Austria

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B.C.E. 1959, M.C.E. 1961, Polytechnic Institute of Brooklyn; Ph.D. 1968, Massachusetts Institute of Technology

John Lindsey Whitesides, Jr., *Assistant Research Professor of Engineering*
B.S. 1965, Ph.D. 1968, University of Texas at Austin

Paul Willis, *Assistant Professorial Lecturer in Engineering*
B.S. 1952, Southern Methodist University; B.E.E. 1953, M.E.E. 1962, Polytechnic Institute of Brooklyn

Robert Wilson, *Professorial Lecturer in Engineering*
B.S. 1941, M.S. 1942, Georgia Institute of Technology; Ph.D. 1952, University of Texas at Austin.

John Leonard Wolfgang, Jr., *Assistant Professorial Lecturer in Engineering*
B.E.E. 1962, M.S. in Engr. 1967, George Washington University

William Arnold Wood, *Research Professor of Materials Science*
B.S. (Engr.) 1927, B.S. (Physics) 1928, M.S. 1929, D.Sc. 1935, Manchester University, England

Selwyn Edgar Wright, *Assistant Research Professor of Engineering*
Ph.D. 1969, University of Southampton, England

Michael Yachnis, *Associate Professorial Lecturer in Engineering*
B.S. 1943, Military College, Athens, Greece; B.S. in C.E. 1951, Military Technical Training College, Athens, Greece; M.S. in Engr. 1956, M.E.A. 1962, D.Sc. 1968, George Washington University

Joseph Yahalom, *Visiting Associate Professor of Materials Engineering*
B.S. 1956, Technion-Israel Institute of Technology; Ph.D. 1963, Cambridge University, England

Edward Carson Yates, Jr., *Associate Professorial Lecturer in Engineering*
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Felix Yochanan Yokel, *Associate Professorial Lecturer in Engineering*
B.S. 1959, M.S. 1961, Ph.D. 1963, University of Connecticut

Theodore Richard Young, *Adjunct Professor of Engineering*
B.S. 1949, University of Rochester

Shao Wen Yuan, *Professor of Engineering and Applied Science*
B.S. 1936, University of Michigan; M.S. 1937, Ph.D. 1941, California Institute of Technology; Ae.E. 1939, Stanford University

Paul Zilczer, *Professorial Lecturer in Engineering*
M.S. 1932, D.Sc. 1933, University of Budapest, Hungary

ASSISTANTS IN INSTRUCTION

Kiencheng Chang, *Graduate Teaching Fellow in Engineering*
B.S. in Ae.E. 1966, University of Maryland

Ernesto Gonzaga, *Graduate Teaching Fellow in Electrical Engineering*
B.S. in E.E. 1964, Polytechnic Colleges of the Philippines

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B.A. 1963, M.A. in Operations Research 1965, University of Delhi, India; M.S. in Operations Research 1968, Cornell University; D.Sc. 1970, George Washington University

Khalilollah Khozeimeh, *Graduate Teaching Fellow in Engineering Mechanics*
B.C.E. 1965, M.S. 1967, George Washington University

Rodolfo Laporta, *Graduate Teaching Fellow in Civil Engineering*
B.S.(C.E.) 1970, George Washington University

Alexander Meeraus, *Graduate Teaching Fellow in Engineering*
M.S. in M.E. 1968, Technical University, Vienna, Austria

Omar Khayyam Raheem, *Graduate Teaching Fellow in Engineering*
B.S. 1966, University of Ceylon

John Moody Saunders, *Graduate Teaching Fellow in Electrical Engineering*
B.E.E. 1966, George Washington University

Tham Quang Thanh, *Graduate Teaching Fellow in Mechanical Engineering*
B.S. in M.E. 1969, University of Miami

Theodore S. Trybul, *Graduate Teaching Fellow in Engineering Administration*
B.S. 1957, University of Illinois; M.S. 1963, University of New Mexico

Paul Anthony Willis, *Graduate Teaching Fellow in Engineering*
B.S. 1952, Southern Methodist University; B.E.E. 1958, M.S. in E.E. 1962, Polytechnic Institute of Brooklyn

Jalal Yassaee, *Graduate Teaching Fellow in Electrical Engineering*
B.S. 1966, Tehran University, Iran; M.S. 1970, George Washington University

Robert Mayer Zeskind, *Graduate Teaching Fellow in Electrical Engineering*
B.S. in Engr. 1965, Case Western Reserve University; M.S. 1968, George Washington University

APPENDIX: RECENTLY ESTABLISHED REGULATIONS

THE FOLLOWING UNIVERSITY REGULATIONS are under review and may be subject to change in connection with the establishment of judicial processes. Bulletins and handbooks incorporating any changes will be issued as appropriate.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on October 19, 1968:

Whereas, safety and order are essential preconditions of the learning process, and indeed of the very concept of a university; and

Whereas, The George Washington University is committed to protection of free speech and freedom of assembly, and to safeguarding the right of lawful protest on campus; and is committed equally to maintaining the peace and safety of the campus, in the knowledge that all rights are in jeopardy when violence and civil disorder prevail over law and reason;

Now, therefore, be it resolved by the Senate of The George Washington University: that in the event a demonstration at this University exceeds the bounds of free assembly and lawful advocacy, and demonstrators are engaging in unlawful acts which cause or imminently threaten injury to persons or property, or which obstruct or interfere with normal and necessary University activities, this body affirms the authority of the President, or other University officials designated to act in his absence, to take such reasonable steps, if possible after consultation with the Chairman of the Executive Committee of the University Senate and the President of the Student Body, as are required to restore and preserve order; including, if deemed necessary and appropriate, suspension of students or faculty engaging in such acts, and use of such law enforcement personnel as are needed to effect the removal, arrest, and prosecution of law violators. Any such suspension shall be reviewed by an appropriate tribunal as soon after order is restored as is practicably possible.

The following was approved by the University's Board of Trustees on October 19, 1968:

Any student suspended from The George Washington University on the grounds of exceeding the bounds of free assembly and lawful advocacy shall have his suspension reviewed by the Hearing Committee on Student Affairs of The George Washington University as soon after order is restored as is practicably possible.

The following resolution, submitted by the Student Life Committee, was approved by the University's Board of Trustees on October 19, 1968:

Be it resolved that The George Washington University: affirms its traditional commitment to freedom of expression (a) by continuing to permit business and government organizations which are recruiting employees to conduct their activities at designated places on campus, and (b) by placing no obstacle to students who may wish to protest the presence of such recruiters, provided, however, that such protest shall be orderly and shall not impede or disrupt the recruiter in his activities.

The University affirms its place as a forum for the free exchange of ideas (a) by assuring that guests invited to speak on this campus at duly scheduled meetings shall have the right to appear and to be heard, and (b) by sanctioning the freedom of students to express dissent from the views of the speaker provided, however, that that expression of dissent be orderly and nonobstructive.

The University distinguishes between orderly protest and resistance-by-obstruction; it accepts the former as a legitimate expression of dissent while rejecting the latter as an abridgement of the freedoms of the individuals who may be its object.

The following was approved by the University's Board of Trustees on October 19, 1968:

The George Washington University is opposed to discrimination based on race, color, or creed. Such discrimination may have appeared in campus organizations in the past. In the future, however, no organization can be recognized or supported by the University unless it provides continued assurance of nondiscrimination in membership practices and in intent, considered adequate by relevant committees and officers of the University.

The following was approved by the University's Board of Trustees on October 19, 1968:

The University cannot condone violations of law, including violation of those laws which proscribe possession, use, sale, or distribution of certain drugs. Members of the academic community should know that administrative action, which may include dismissal from the residence halls, revocation of other privileges, or suspension or dismissal from the University, may be taken in order to protect the interests of the University and the rights of others.

The Board of Trustees reaffirms the responsibility of the President and the Faculty to continue to implement this policy.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on January 16, 1969:

Be it resolved by the Senate of The George Washington University: Any member of the University (including as members of the University all persons having a formal connection with the University)

(a) who engages in conduct that unreasonably obstructs teaching, research, and learning, or

(b) who unreasonably obstructs free access to members or guests of the University or to University buildings, or

(c) who disobeys general regulations of the University, or

(d) who damages University property or injures members or guests of the University,

may be punished for his conduct by dismissal from the University, or by some lesser disciplinary action, through procedures established within the University for the government of its members.

In order to insure due process, any student subject to dismissal or other disciplinary action on the grounds of violating any of the premises of this resolution shall have, at his discretion, the right of review of the action by the University Hearing Committee on Student Affairs.

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2/71—Cornellus—30M

COLLEGES AND SCHOOLS—DEGREE PROGRAMS

COLUMBIAN COLLEGE OF ARTS AND SCIENCES: Associate in Arts (A.A.), Bachelor of Arts (B.A.), Bachelor of General Studies (B.Gen.Std.), Bachelor of Science (B.S.), Bachelor of Science in Environmental Health (B.S. in Env.Health), Bachelor of Science in Geodetic and Cartographic Science (B.S. in Geod. and Cart.Sc.), Bachelor of Science in Medical Technology (B.S. in Med.Tech.), and Bachelor of Science in Oceanography (B.S. in Ocea.)

GRADUATE SCHOOL OF ARTS AND SCIENCES: Master of Arts (M.A.), Master of Fine Arts (M.F.A.), Master of Music (Mus.M.), Master of Science (M.S.), Master of Science in Forensic Science (M.S. in Forens.S.), Master of Science for Teachers (M.S. for Teachers), and Doctor of Philosophy (Ph.D.)

SCHOOL OF MEDICINE: Doctor of Medicine (M.D.)

NATIONAL LAW CENTER: Juris Doctor (J.D.), Master of Laws (LL.M.), Master of Comparative Law (M.Comp.L.), Master of Comparative Law (American Practice) (M.Comp.L.(Am.Prac.)), and Doctor of Juridical Science (S.J.D.)

SCHOOL OF ENGINEERING AND APPLIED SCIENCE: Bachelor of Science (Civil Engineering) (B.S. (C.E.)), Bachelor of Science (Electrical Engineering) (B.S. (E.E.)), Bachelor of Science (Measurement Science) (B.S. (Meas.S.)), Bachelor of Science (Mechanical Engineering) (B.S. (M.E.)), Master of Science (M.S.), Master of Engineering Administration (M.E.A.), and Doctor of Science (D.Sc.)

SCHOOL OF EDUCATION: Bachelor of Arts in Education (B.A. in Ed.), Bachelor of Science in Physical Education (B.S. in P.E.), Master of Arts in Teaching (M.A.T.), Master of Arts in Education (M.A. in Ed.), Education Specialist (Ed.S.), and Doctor of Education (Ed.D.)

SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION: Bachelor of Business Administration (B.B.A.), Bachelor of Science in General Studies (B.S. in Gen.Std.), Master of Arts in Government (M.A. in Govt.), Master of Arts in Health Care Administration (M.A. in H.C.A.), Master of Business Administration (M.B.A.), Master of Public Administration (M.P.A.), Master of Science in Administration (M.S. in Adm.), Master of Urban and Regional Planning (M. of Urb. and Reg.Plan.), Graduate Certificate in Health Care Administration (Grad.Cert. in H.C.A.), Doctor of Business Administration (D.B.A.), and Doctor of Public Administration (D.P.A.)

SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS: Bachelor of Arts (B.A.), Certificate of the Institute for Sino-Soviet Studies (Cert. of I.S.S.S.), Master of Arts (M.A.), and Master of Science in International Affairs (M.S. in I.A.)

ANNUAL ISSUES OF THE UNIVERSITY BULLETIN

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NATIONAL LAW CENTER, Dean of the Center

SCHOOL OF ENGINEERING AND APPLIED SCIENCE, Dean of the School

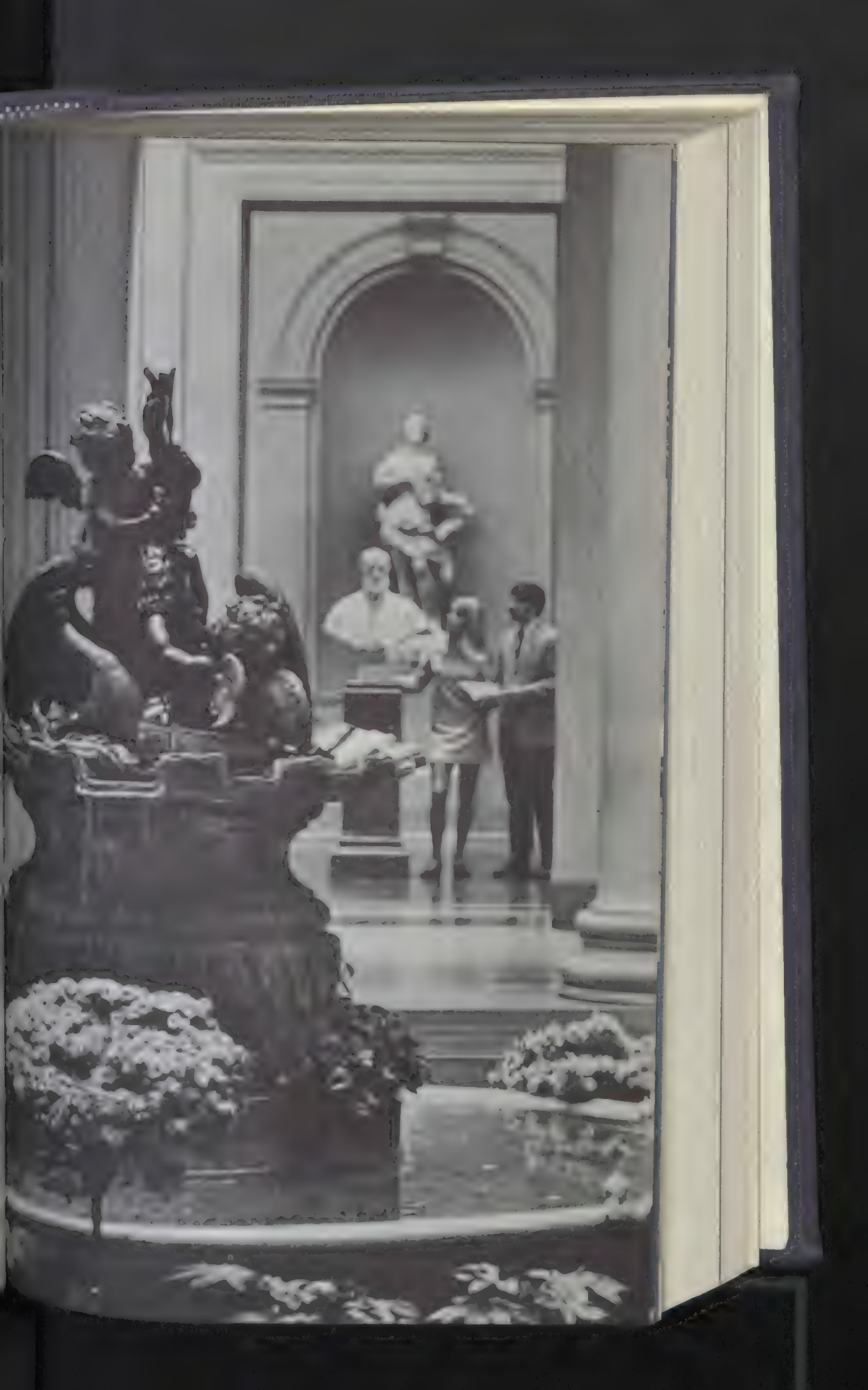
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SCHEDULE OF CLASSES: FALL AND SPRING SEMESTERS, Registrar

SCHEDULE OF CLASSES: SUMMER SESSIONS, Dean of the Summer Sessions




BULLETINS
MAP OF CAMP









FACTS ABOUT GEORGE WASHINGTON UNIVERSITY

General Information	Private, nonsectarian, coeducational, founded 1821
Location	Washington, D.C., bounded by Pennsylvania Avenue and 19th, F, and 24th Streets, N.W.
Number of Students	14,556 (9,438 men, 5,118 women)
Number of Undergraduates	5,487 (2,739 men, 2,748 women)
Geographical Origin of Students	50 states, District of Columbia, 92 countries; 20% are from the Washington area
Number of Full-time Faculty	722 (73% with Doctoral degrees)
Number of Part-time Faculty	327 (includes some of the most distinguished men in Washington who serve as professorial lecturers)
Residence Hall Space	2,212 (an additional 1,500 students reside in fraternity houses, rooms, and apartments on or near the campus)
Room and Board	Cost varies from $1,260 to $1,385 for the academic year (see page 127)
Campus Organizations	145

Undergraduate majors: Accounting, American Civilization, American Literature, Anthropology, Applied Mathematics, Applied Statistics, Art History and Theory, Biology, Botany, Business Administration, Business and Economic Statistics, Chemistry, Chinese Studies, Civil Engineering, Classical Archeology and Greek, Classical Humanities, Dramatic Art, Economics, Electrical Engineering, Elementary Education, English Literature, Fine Arts, French Language and Literature, Geography, Geology, Germanic Languages and Literatures, History, International Affairs, International Business, Journalism, Latin, Latin American Studies, Mathematical Statistics, Mathematics, Measurement Science, Mechanical Engineering, Medical Technology, Music (Applied, History and Literature, Theory), Philosophy, Physical Education, Physics, Political Science, Premedicine, Psychology, Public Affairs, Religion, Russian Language and Literature, Secondary Education, Sociology, Spanish American Literature, Spanish Language and Literature, Speech Communication, Speech Pathology and Audiology, Zoology.

Study leading to graduate or professional degrees is offered in the Graduate School of Arts and Sciences, the National Law Center, the School of Medicine, the School of Engineering and Applied Science, the School of Education, the School of Government and Business Administration, and the School of Public and International Affairs.



GEORGE WASHINGTON UNIVERSITY CAMPUS / WASHINGTON, D.C.

THE GEORGE WASHINGTON UNIVERSITY

COLUMBIAN COLLEGE OF ARTS AND SCIENCES, 1821

THE GRADUATE SCHOOL OF ARTS AND SCIENCES, 1893

THE SCHOOL OF MEDICINE, 1825

THE NATIONAL LAW CENTER, 1865

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE, 1884

THE SCHOOL OF EDUCATION, 1907

THE SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION, 1928

THE SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS, 1928

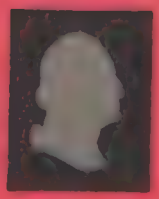
THE COLLEGE OF GENERAL STUDIES, 1950

THE DIVISION OF UNIVERSITY STUDENTS, 1930

THE SUMMER SESSIONS, 1916

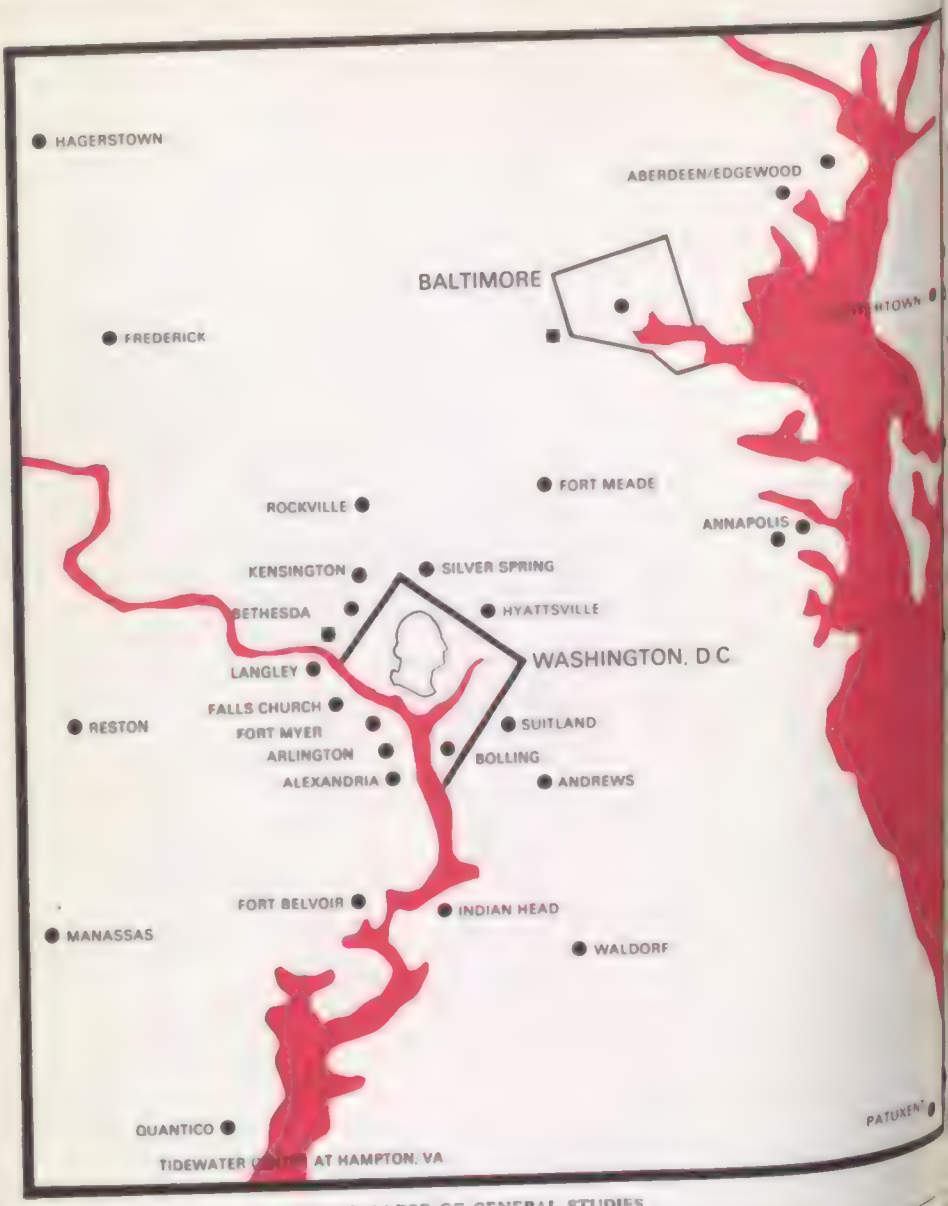
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THE GEORGE WASHINGTON UNIVERSITY BULLETIN



COLLEGE
OF
GENERAL STUDIES

1971-1972



OFF-CAMPUS LOCATIONS OF THE COLLEGE OF GENERAL STUDIES

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THE GEORGE WASHINGTON UNIVERSITY BULLETIN

THE COLLEGE OF GENERAL STUDIES 1971–72

WASHINGTON, D.C. 20006



Dean Magruder

From the Dean's Desk . . .

The George Washington University, now 150 years old, is strongly committed to meeting the needs of the adult part-time student. The College of General Studies, the off-campus division of the University, is dedicated to making this commitment a reality.

For twenty years, the College has offered classes at centers throught the greater metropolitan area to help adults complete credit course work or degree programs to qualify for increased levels of responsibility: to attain the educational background necessary to enter new career fields; to update their education or continue into graduate-level specializations; and to achieve a sense of personal growth and involvement.

In recent months, the needs for opportunities in and acceptance of continuing education have received increased national interest. A major commission report on higher education has focused attention on the need for more flexibility in the area of higher education with particular emphasis on adapting to the requirements of the adult student. The need for a more even balance between education, work, and leisure throughout the total life span has been pointed out. The real dropout has been described as the person who fails to continue his education throughout his career and into retirement.

The College of General Studies is constantly developing and expanding its programs to respond to such challenges. We look forward with confidence to continuing our role in the development of new answers to the educational needs of a changing world.

Eugene R. Magruder
Dean
College of General Studies

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1971

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OCTOBER

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1971 FALL SEMESTER

August 16–September 10	Off-campus registration† (days of registration and beginning clases will be announced in *Off-campus Schedule of Classes*)
	Application for February graduation due as part of registration
‡*September 9–11*	Registration on campus† *Thursday–Saturday*
	Application for February graduation due as part of registration
September 13	Classes begin off campus and on campus *Monday*
September 20	No classes off campus and on campus *Monday*
September 29	No classes off campus and on campus *Wednesday*
October 11	No off-campus classes *Monday*
October 25	No off-campus classes *Monday*

* Off-campus courses organized at any time.
† Application for graduation and for Master's Comprehensive Examinations is the student's responsibility and must be made when registering for last courses required for degree.
‡ Hours of registration will be announced in the *Campus Schedule of Classes*.

November 24	Thanksgiving recess begins after last class *Wednesday*
November 29	Classes resume *Monday*
December 3–4	M.A. in Sp.Std., M.S. in Adm., and M.S. in Sp.Std. Comprehensive Examinations *Friday–Saturday*
December 6	School of Engineering and Applied Science Master's theses of February candidates due in Dean's Office *Monday*
December 10	Last day of campus fall-semester classes *Friday*
December 13–22	Campus examination period *Monday–Wednesday*
**December 22*	Last day of off-campus fall-semester classes *Wednesday*
January 3	Master's theses (other than those in the School of Engineering and Applied Science) of February candidates due in Dean's Office *Monday*

1972 SPRING SEMESTER

January 10–21	Off-campus registration† (days of registration and beginning classes will be announced in *Off-campus Schedule of Classes*
	Application for May graduation due as part of registration
‡*January 20–22*	Registration on campus† *Thursday–Saturday*
	Application for May graduation due as part of registration
January 24	Classes begin off campus and on campus *Monday*
February 21	Winter Convocation (holiday) *Monday*
March 25	Spring recess begins after last class *Saturday*
April 3	Classes resume *Monday*
April 14	School of Engineering and Applied Science Master's theses of May Candidates due in Dean's Office *Saturday*
April 14–15	M.A. in Sp.Std., M.S. in Adm., and M.S. in Sp.Std. Comprehensive Examinations *Friday–Saturday*
April 24	M.S. in I.A. theses of May candidates due in Dean's Office *Monday*
**April 28*	Last day of off-campus spring-semester classes *Friday*
April 28	Last day of campus spring-semester classes *Friday*
May 1	M.S. in Adm. theses of May candidates due in Dean's Office *Monday*
May 4–13	Campus examination period *Thursday–Saturday*
May 28	Commencement *Sunday*

1972 SUMMER SESSIONS‡

* The final examination will be given at last class meeting.
† Application for graduation and for Master's Comprehensive Examinations is the student's responsibility and must be made when registering for last courses required for degree.
‡ Hours of registration will be announced in the *Campus Schedule of Classes*
‡ There are two six-week sessions and one twelve-week session. Days of registration and beginning classes will be announced in the *Off-campus Schedule of Classes*



The University's Cloyd Heck Marvin Center

THE UNIVERSITY

HISTORY

GEORGE WASHINGTON UNIVERSITY had its beginning in 1821 as The Columbian College in the District of Columbia. The name of the institution was changed in 1873 to Columbian University and in 1904 to The George Washington University. The debt of the University to George Washington, whose name it bears, is an intangible one.

George Washington, as President and as private citizen, had urgently insisted upon the establishment of a National University in the Federal City. There he hoped that, while being instructed in the arts and sciences, students from all parts of the country would acquire the habits of good citizenship, throwing off local prejudices and gaining at first hand a knowledge of the practice, as well as the theory of republican government. To further the materialization of his hopes, Washington left a bequest of fifty shares of The Potomac Company "towards the endowment of a University to be established within the limits of the District of Columbia, under the auspices of the General Government, if that government should incline to extend a fostering hand towards it." The Congress never extended "a fostering hand." The Potomac Company passed out of existence, and Washington's bequest became worthless.

Fully conscious of Washington's hopes, but motivated primarily by a great missionary urge and the need for a learned clergy, a group of dedicated ministers and laymen sponsored a movement for the establishment of a college in the District of Columbia. Inspired largely by the zeal and energy of the Reverend Luther Rice, they raised funds for the purchase of a site and petitioned Congress for a charter. After much delay and amendment, Congress granted a charter which was approved by President Monroe on February 9, 1821. To safeguard the College's nonsectarian character it provided "That persons of every religious denomination shall be capable of being elected Trustees; nor shall any person, either as President, Professor, Tutor or pupil, be refused admittance into said College, or denied any of the privileges, immunities, or advantages thereof, for or on account of his sentiments in matters of religion."

During the entire time when the institution was known as Columbian College, its activities were centered on College Hill, a tract of forty-six and a half acres between the present Fourteenth and Fifteenth Streets extending north from Florida Avenue to somewhat beyond Columbia Road. The Medical School was located downtown. For the better part of the Columbian University period, the buildings of the University were situated along H Street between Thirteenth and Fifteenth Streets. The Medical School group still remains there.

During the last half century the University's present plant has been developed in that section of the old First Ward familiarly known as "Foggy Bottom."

between Nineteenth and Twenty-fourth Streets, south of Pennsylvania Avenue. The area is not without its reminders of historic interest to the University. President Monroe, who signed the charter, lived at 2017 Eye Street. The first President of the Board of Trustees, the Reverend Obadiah B. Brown, was for fifty years the pastor of a church at Nineteenth and Eye Streets, and Washington selected Twenty-third and E Streets as the site of the National University he had hoped to see established.

THE COLLEGES, SCHOOLS, AND DIVISIONS

George Washington University includes eleven colleges, schools, and divisions, as follows:

*Columbian College of Arts and Sciences**, through its lower and upper divisions, offers four-year programs in the arts and sciences leading to the degrees of Bachelor of Arts, Bachelor of Science, and (in cooperation with the Department of Pathology and the University Hospital) Bachelor of Science in Medical Technology. The lower division also provides the first two years of the prelegal and premedical programs; the preprofessional work required for admission to the School of Education, the School of Government and Business Administration, and the School of Public and International Affairs. Columbian College also has academic jurisdiction over off-campus programs leading to the degrees of Associate in Arts in General Studies, Bachelor of General Studies, Bachelor of Science in Environmental Health, Bachelor of Science in Geodetic and Cartographic Science, and Bachelor of Science in Oceanography. These off-campus programs are administered by the College of General Studies.

The Graduate School of Arts and Sciences† offers advanced study and research leading to the degrees of Master of Arts, Master of Fine Arts, Master of Music, Master of Science, Master of Science in Forensic Science, Master of Science for Teachers, and Doctor of Philosophy. The School also has academic jurisdiction over the off-campus programs leading to the degrees of Master of Arts in Special Studies, Master of Science in Special Studies, and Master of Science in Special Studies (Oral Biology), which are administered by the College of General Studies.

The School of Medicine† offers work leading to the degree of Doctor of Medicine.

The National Law Center offers courses leading to the degrees of Juris Doctor, Master of Laws, Master of Comparative Law, Master of Comparative Law (American Practice), and Doctor of Juridical Science; and special programs in Continuing Legal Education.

The School of Engineering and Applied Science offers courses leading to the degree of Bachelor of Science in the following areas: Civil Engineering, Electrical Engineering, and Mechanical Engineering. Graduate programs lead to the degrees of Master of Science, Master of Engineering Administration, and Doctor of Science. The School also has academic jurisdiction over the off-campus Master's degree programs at the NASA-Langley Research Center and the Naval Ship Research and Development Laboratory. These off-campus programs are administered by the College of General Studies.

* Columbian College of Arts and Sciences cooperates with the School of Medicine in offering a program leading to the combined degrees of Bachelor of Arts and Doctor of Medicine.
† The Graduate School of Arts and Sciences cooperates with the School of Medicine in offering a program leading to the combined degrees of Master of Science and Doctor of Medicine and a dual program leading to the degrees of Doctor of Medicine and Doctor of Philosophy

The School of Education offers undergraduate programs leading to the degrees of Bachelor of Arts in Education and Bachelor of Science in Physical Education; graduate studies leading to the degrees of Master of Arts in Education, Master of Arts in Teaching, Education Specialist, and Doctor of Education. The School also has academic jurisdiction over the off-campus programs leading to the degree of Master of Arts in Education, which are administered by the College of General Studies.

The School of Government and Business Administration offers undergraduate programs leading to the degree of Bachelor of Business Administration and graduate programs leading to the degrees of Master of Arts in Government, Master of Arts in Health Care Administration, Master of Business Administration, Master of Public Administration, Master of Urban and Regional Planning; the Post-Master's Graduate Certificate in Health Care Administration; the degrees of Doctor of Business Administration and Doctor of Public Administration. The School also has academic jurisdiction over the off-campus programs leading to the degrees of Bachelor of Science in Administration and Master of Science in Administration, which are administered by the College of General Studies.

The School of Public and International Affairs offers undergraduate programs leading to the degree of Bachelor of Arts and graduate programs leading to the degree of Master of Arts. The School offers an off-campus program leading to the degree of Master of Science in International Affairs.

The College of General Studies supplements the adult education program of the University through campus and off-campus study; conferences, seminars, and special projects; and continuing education and noncredit programs. This College also administers the off-campus programs over which Columbian College of Arts and Sciences, the Graduate School of Arts and Sciences, the School of Education, the School of Engineering and Applied Science, and the School of Government and Business Administration, have academic jurisdiction.

The Division of University Students makes available courses for students not candidates for degrees in this University.

The Summer Sessions.

ACADEMIC STATUS

George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Secondary Schools.

The University is on the approved list of the American Association of University Women and is a member of the College Entrance Examination Board.

The School of Education is a charter member of the American Association of Colleges for Teacher Education and is accredited by the National Council for Accreditation of Teacher Education for its Bachelor's and Master's degree programs.

The School of Government and Business Administration has maintained full membership in the Middle Atlantic Association of Colleges of Business Administration since 1961. It joined the Council on Graduate Education for Public Administration in 1966. By invitation, in 1968, the School became a charter academic member of the American Association of Collegiate Schools of Business Assembly. The programs in Public Accounting designed to prepare students for Certified Public Accountants examinations have been approved by the state boards of New York and of Maryland. The program in Hospital

Administration is accredited by the National Accrediting Commission on Graduate Education for Hospital Administration.

LOCATION

The University is in downtown Washington, between Pennsylvania Avenue and 19th, F, and 24th Streets, N.W. In immediately adjacent areas are the White House, the World Bank, the United States Information Agency, the Corcoran Gallery of Art, the Department of State, the Department of the Interior, the General Services Administration, the National Academy of Sciences, and the Kennedy Center for the Performing Arts.

GOVERNMENT

The University is privately endowed and is governed by a self-perpetuating Board of Trustees, with the President of the University as an ex officio member. The members of the Board are named for a period of three years and are divided into three classes. The members of one class are elected at each annual meeting to fill the places of the members whose terms of office expire. Two members of each class are nominated by the Alumni Association.

THE GENERAL ALUMNI ASSOCIATION

The objectives of this Association are to unite the graduates who wish to associate themselves for charitable, educational, literary, and scientific purposes, and to promote the general welfare of the University.

Eligible members are those who have matriculated in any school of the University and who have left the University in good standing, or any person who is or has been a member of the teaching, research, or administrative staff of the University, or of the Board of Trustees of the University. Active members are those eligible members who are current contributors (dues or otherwise) to or life members of the George Washington University General Alumni Association, the Alumni Association of any school of the University, or contributors to the George Washington University Fund.

The Alumni Office is in Bacon Hall, 2000 H Street, N.W., Washington, D.C. 20006.

All alumni are urged to keep the Alumni Office informed of changes of address or occupation and to supply information with regard to their fellow alumni.

THE BOARD OF TRUSTEES

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Robert Calhoun Baker, LL.D.
*Everett Hollis Bellows, B.A., M.A.
*Harold Keith Bradford, B.A., LL.B.

* Nominated by the alumni.

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George A. Butler, LL.B.
Mortimer Maxwell Caplin, B.S., LL.B., J.S.D., LL.D.
Leonard Carmichael, Ph.D., Sc.D., LL.D., Litt.D., L.H.D., D.C.L.
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Miss Jacqueline Cochran, L.H.D., LL.D., Sc.D.
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*Harry Filmore Dowling, B.A., M.D., Sc.D.
Harry F. Duncan
John Bonner Duncan, B.A., LL.B., LL.D.
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Mrs. Katharine Graham, B.A.
Melville Bell Grosvenor, B.S., Sc.D., LL.D.
Richard Arnold Harrison, B.A., M.A.
Brooks Hays, B.A., J.D., LL.D., L.H.D., D.C.L., D.D., HH.D.
Joseph H. Hirshhorn
Joseph D. Hughes, B.S., J.D., LL.M., LL.D.
Lewellyn A. Jennings
David Matthew Kennedy, LL.B., B.A., LL.D.
*Thaddeus A. Lindner, B.A. in Govt.
Franklin Jerome Lunding, LL.B., LL.D.
Jeremiah Milbank, Jr., B.A., M.B.A.
Godfrey Leon Munter, B.A., LL.B., LL.D.
Donald W. Nyrop, B.A., LL.B.
*Mrs. Beverly Ann Henry Oliphant, B.S., M.S., M.D.
Thornton W. Owen, B.S. in C.E., B.A.
Miss Flaxie M. Pinkett, B.A.
Sidney Dillon Ripley II, Ph.D., L.H.D., Sc.D.
Orville Findley Rush, J.D., LL.D.
Carleton D. Smith
Charles E. Smith
Douglas Rathbone Smith, B.S.C.
Mark Sullivan, Jr., B.A.
*William Gregg White, B.S. in C.E.
John Johnston Wilson, LL.B.
Watson W. Wise, Ph.B.
Stephen Russell Woodzell, B.S. in E.E.
James Otis Wright, B.S., J.D.

HONORARY TRUSTEES

Walter Maximillian Bastian, LL.B., LL.D.
Newell Windom Ellison, B.A., LL.B., LL.D.
Charles Carroll Glover, Jr., M.A., LL.B., LL.D.
John Edgar Hoover, LL.M., LL.D., Sc.D., D.C.L.
Alfred Henry Lawson, LL.B., LL.D.
John Keown McKee
Benjamin Mosby McKelway, Litt.D.

* Nominated by the alumni.

Sidney William Souers, B.A., LL.D.
Lewis L. Strauss, Sc.D., LL.D., L.H.D.
Alexander Wetmore, Ph.D., Sc.D.
Lloyd Bennett Wilson

OFFICERS OF ADMINISTRATION

THE UNIVERSITY

Lloyd Hartman Elliott, M.A., Ed.D., LL.D., *President*
Harold Frederick Bright, Ph.D., *Provost and Vice President for Academic Affairs*
Henry William Herzog, B.S., *Vice President and Treasurer*
Seymour Alpert, B.A., M.D., *Vice President for Development*
H. John Cantini, Jr., J.D., *Vice President for Administration*
William David Johnson, B.S., *Director of the Budget*
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Frederick Russell Houser, M.A., *Registrar*
Joseph Young Ruth, B.A., *Director of Admissions*

COLLEGE OF GENERAL STUDIES

Eugene Ross Magruder, Ph.D., *Dean of the College of General Studies*
Alvin Carl Jensen, Ed.D., *Associate Dean of the College of General Studies*

COLUMBIAN COLLEGE OF ARTS AND SCIENCES

Calvin Darlington Linton, Ph.D., *Dean of Columbian College of Arts and Sciences*
Barbara Joan Dunham, M.A., *Assistant Dean of Columbian College of Arts and Sciences*
Joseph Louis Métivier, Jr., M.A., *Assistant Dean of Columbian College of Arts and Sciences*
Robert Clinton Rutledge, Ph.D., *Assistant Dean of Columbian College of Arts and Sciences*
Harry Elwood Yeide, Jr., Ph.D., *Assistant Dean of Columbian College of Arts and Sciences*

GRADUATE SCHOOL OF ARTS AND SCIENCES

Arthur Edward Burns, Ph.D., *Dean of the Graduate School of Arts and Sciences*
William Francis Edward Long, Ph.D., *Associate Dean of the Graduate School of Arts and Sciences*
Edward Alan Caress, Ph.D., *Assistant Dean of the Graduate School of Arts and Sciences*

SCHOOL OF ENGINEERING AND APPLIED SCIENCE

Harold Liebowitz, D.Ae.E., *Dean of the School of Engineering and Applied Science*
Galip Mehmet Arkilic, Ph.D., *Acting Assistant Dean of the School of Engineering and Applied Science*

SCHOOL OF EDUCATION

Rodney Tillman, Ed.D., *Dean of the School of Education*
Robert Edward Baker, M.A., Ed.D., *Assistant Dean of the School of Education*

SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION

James Carlton Dockeray, Ph.D., *Dean of the School of Government and Business Administration*
John Lobuts, Jr., B.S., Ed.D., *Director of Off-campus Programs*



Students in Business Administration meet for evening class in training room of downtown office building.

COLLEGE OF GENERAL STUDIES

Dean E.R. Magruder
Associate Dean A.C. Jensen

DEAN'S COUNCIL

E.R. Magruder *(Chairman)*, R.E. Baker, V.H. Cohn, Marvin Gordon, R.L. Holland, A.C. Jensen, H.L. LeBlanc, Hyman Orlin, R.C. Rutledge, J.E. Johnston (ex officio)

COMMITTEE ON SCHOLARSHIP

A.C. Jensen, *(Chairman)*, R.E. Baker, R.L. Holland, Mary Holman, J.A. Morgan, Jr., Charles Rice, J.E. Johnston (ex officio), E.R. Magruder (ex officio)

INTRODUCTION

The College of General Studies, the off-campus division of George Washington University, was established in 1950 to extend the educational resources of the University to the community. The College continues in expanding the University's activities by providing academic programs for adult students and by helping to meet the continuing educational requirements of the National Capital area.

The College offers off-campus credit courses for the nondegree student, whether for personal enrichment or for updating or upgrading his professional credentials. Off-campus degree programs, administered by the College of General Studies for other colleges and schools of the University, are offered at the undergraduate and graduate levels for students who wish to pursue a more formal program of study. Experimental pilot programs of study are developed in cooperation with other colleges and schools of the University in response to specific needs of the government and business community. The College also develops and conducts noncredit courses, seminars, and workshops drawing on the resources of the University.

The Staff of Instruction for the off-campus programs includes members of the full-time faculty of the University and academically qualified part-time lecturers from the Washington professional community.

The College works closely with education directors, public school officials, and personnel administrators in government, business, and industry to develop courses of study and expand the educational opportunities for the mature student. In cooperation with these sponsoring groups the College offers courses at off-campus centers throughout the District of Columbia and in nearby Maryland

and Virginia. Government agencies and installations, business organizations, or professional groups interested in having the College organize and conduct a course or a comprehensive educational program should contact the Associate Dean of the College of General Studies.

ACADEMIC STATUS

The academic standards of the University are maintained in off-campus credit courses.

The College of General Studies is accredited by its regional accrediting agency, the Middle States Association of Colleges and Secondary Schools.

DEGREE PROGRAMS

Columbian College of Arts and Sciences offers the following degrees off campus:

Associate in Arts in General Studies
Bachelor of General Studies
Bachelor of Science in Environmental Health
Bachelor of Science in Geodetic and Cartographic Science
Bachelor of Science in Oceanography

The Graduate School of Arts and Sciences offers the following degrees off campus:

Master of Arts in Special Studies
Master of Science in Special Studies
Master of Science in Special Studies (Oral Biology)

The School of Engineering and Applied Science offers the following degrees off campus:

Master of Engineering Administration
Master of Science

The School of Education offers the following degrees off campus:

Master of Arts in Education

The School of Government and Business Administration offers the following degrees off campus:

Bachelor of Science in Administration
Master of Science in Administration

Admission

NONDEGREE STUDENTS

OFF-CAMPUS CREDIT COURSES may be taken by nondegree students who meet the prerequisites prescribed by the department concerned; if they have previously attended a college or university, they must be in good standing. Formal University admission is not required for registration.

Nondegree students wishing to enroll in graduate courses must have completed a Bachelor's degree, or have 90 semester hours of undergraduate work and the permission of the instructor. Students with 90 semester hours of undergraduate work wishing to register for graduate courses in Accounting, Business

Administration, Health Care Administration, Management Science, or Public Administration must have (1) a 3.00 average, (2) the prior approval of the department chairman who is responsible for the graduate course, (3) the prior approval of the faculty adviser, and (4) the prior approval of the Dean of the School of Government and Business Administration.

Credits earned as a nondegree student may later be transferred to degree programs at George Washington University or other colleges and universities, providing they are applicable to the desired curriculum and providing the student meets the requirements of the degree program for which he is applying.

ADMISSION AS A DEGREE CANDIDATE

Students wishing to be admitted as candidates for one of the off-campus undergraduate or graduate degree programs of George Washington University may obtain application forms from the College of General Studies, one of the University's representatives of the Off-campus Credit Programs, or the Education Officer of his agency or installation. For admissions procedure to campus degree programs, refer to the *Undergraduate and Graduate Catalogue* or the *School of Engineering and Applied Science* catalogue of George Washington University.

An application for admission, required credentials, and a nonrefundable application fee of $25* should be sent to the appropriate office.

Records presented become the property of the University and *cannot* be returned.

UNDERGRADUATE DEGREE CANDIDACY

Completed application, required credentials, and the application fee should be sent to the Office of Admissions, George Washington University, 2121 Eye Street, N.W., Washington, D.C. 20006.

Secondary school graduates applying for Associate in Arts in General Studies or Bachelor's degree candidacy must present the combined evidence of (1) an acceptable certificate of graduation from an accredited secondary school, showing a minimum of fifteen "units"† in a college preparatory or academic curriculum; (2) the principal's statement that the applicant is adequately prepared to undertake college work with reasonable prospect of success; (3) College Entrance Examination Board scores on the Scholastic Aptitude Test and the English Composition Achievement Test (for students out of high school several years, other appropriate tests may be prescribed).

Mature students who do not meet these requirements may be considered for degree candidacy after the satisfactory completion of at least 15 semester hours of course work with a quality-point index of 2.50 or higher, or grades of High Pass or better in 60 per cent of course work. This course work must include Engl 1 or 1*x* and 2, *English Composition*, and 9 semester hours of course work in at least two of the following areas: Humanities (literature, philosophy, for-

* The application fee must be by check or postal money order, payable to George Washington University.

The application fee is waived for a student applying for readmission who was registered as a degree candidate at the time of his last registration at this University and has not since registered at another institution.

† A unit represents a year's study in a secondary school subject, including in the aggregate no less than 120 sixty-minute periods, or the equivalent, of prepared classroom work.

eign languages), Social Science (anthropology, economics, geography, history, political science, sociology), and Natural Science and Mathematical Sciences.

The selection of qualifying courses should be made in conference with the faculty adviser, and a conference concerning plans for study is required of each applicant for admission to candidacy.

ADVANCED STANDING

THROUGH TRANSFER FROM OTHER COLLEGES AND UNIVERSITIES

Properly certified courses taken at accredited colleges or universities may be applied toward a degree, subject to the curriculum requirements of the degree program for which admission is sought. Although a grade of *D* is not acceptable for transfer, it may be used to satisfy a curriculum requirement. It may not, however, be counted toward the total number of semester hours required for the degree, and it should not be repeated.

Transfer students whose previous academic records raise doubts of their ability to complete degree requirements successfully must complete 15 hours of course work in this College with a quality-point index of 2.50 or higher, or grades of High Pass or better in 60 per cent of course work, to be considered for degree candidacy. Courses taken to qualify for candidacy must be distributed over two or more of the following areas: Humanities (literature, philosophy, foreign language), Social Science (anthropology, economics, geography, history, political science, sociology), and Natural Science and Mathematical Sciences. (Students who have not successfully completed an acceptable college course in English Composition must include Engl 1 or 1x and 2. Applicants who have been suspended for academic reasons from this University or another institution must fulfill this same 15-hour requirement and also obtain written approval of a petition for admission to degree candidacy from the appropriate Committee on Admission and Advanced Standing.

The University reserves the right to refuse credit for transfer in whole or in part, or to allow it provisionally. Credit so given may be withdrawn for subsequent poor work.

It is the responsibility of the student to have an official transcript sent directly from each institution formerly attended to the Office of Admissions, George Washington University, Washington, D.C. 20006.

If the transcript from a higher institution includes the record of his secondary school work, it is not necessary for the applicant to have forwarded a separate record from the principal of the secondary school.

THROUGH SERVICE SCHOOLS, VALIDATING EXAMINATIONS, AND CORRESPONDENCE COURSES

In addition to credit allowed in transfer from other accredited colleges or universities, a maximum of 30 semester hours of advanced standing in this College may be obtained by any combination of the following methods.

Service Schools.—Except for those students enrolled as candidates for the Bachelor of Science in Geodetic and Cartographic Science or the Bachelor of Science in Oceanography degree, a maximum of 30 semester hours may be obtained on the basis of service schools satisfactorily completed, as evaluated in accordance with the "Guide to the Evaluation of Educational Experience in the

Armed Forces." Ordinarily such subjects are counted as electives. No credit will be allowed for military experience as such.

Validating Examinations.—A maximum of 12 semester hours may be obtained by validating examinations. With the approval of the departmental adviser concerned, permission to take such examinations is granted those who are qualified by work experience and background. Validating examinations may be taken only once, and a grade of *C* or better is required for credit. The fee for each 3-hour course examination is $108.

Correspondence Courses.—Except for those students enrolled as candidates for the Bachelor of Science in Geodetic and Cartographic Science or the Bachelor of Science in Oceanography degree, a maximum of 15 semester hours may be earned through the successful completion of correspondence courses of college level which are offered by the U.S. Armed Forces Institute or a regionally accredited college or university.

MASTER'S DEGREE CANDIDACY

The Degree of Master of Arts in Education (School of Education).—Application for Master's degree candidacy should be made by the time of registration. Completed application, required credentials, and the application fee should be sent to the Office of the Dean, School of Education, 2201 G Street, N.W., Washington, D.C. 20006.

Admission to graduate study toward a Master's degree requires a Bachelor's degree from an accredited institution, an undergraduate quality-point index of 2.50 (a *C* + average) or above, demonstrated interest in teaching, and personal traits that give promise of better-than-average success as a teacher. Two years of successful teaching are required before admission to candidacy in the field of school administration.

The Degree of Master of Science in Administration (School of Government and Business Administration).—Application for Master's degree candidacy *must* be made before or immediately after registration. Completed application, required credentials, and the application fee should be sent to the Admissions Officer, School of Government and Business Administration, 710 21st Street, N.W., Washington, D.C. 20006.

The general requirement for Master's candidacy is a Bachelor's degree from a regionally accredited college or university with an over-all quality-point index of 3.00 (a *B* average), adequate undergraduate preparation for the chosen area of concentration, and satisfactory performance on the Admission Test for Graduate Study in Business*. Students with undergraduate averages below *B* may qualify by their scores on the Admission Test for Graduate Study in Business. Students who lack the necessary undergraduate background for the chosen graduate field my quality by earning a *B* or better grade in prescribed undergraduate courses.

The Admission Test for Graduate Study in Business must be taken prior to application for degree candidacy or during the semester in which application is made. For information concerning the date and place for taking the test, contact the Educational Testing Service, Box 955, Princeton, N.J. 08540.

* This is a test of general aptitude and does not presume an undergraduate major in Business Administration.

No more than 6 semester hours of credit toward the Master's degree will be granted for work taken in nondegree status at this University (before application to this degree program and while the application is being processed).

A maximum of 6 semester hours of advanced standing may be credited toward the degree by transfer of credit for approved graduate work taken at an accredited college or university.

The Degrees of Master of Arts in Special Studies or *Master of Science in Special Studies (Graduate School of Arts and Sciences).*—Application for Master's degree candidacy must be made before or immediately after registration. Completed application, required credentials, and the application fee should be sent to the Office of the Dean, Graduate School of Arts and Sciences, 2000 H Street, N.W., Washington, D.C. 20006.

Admission to graduate study toward a Master's degree in this School requires a Bachelor's degree, from an accredited college or university, with an over-all quality-point index of 3.00 (a *B* average) or an equivalent grade.

No more than 6 semester hours of credit toward a Master's degree will be granted for work taken in nondegree status at this University (before application to a degree program and while the application is being processed).

A maximum of 6 semester hours of advanced standing may be credited toward a Master's degree by transfer of credit for approved graduate course work taken at an accredited college or university.

The Degrees of Master of Science or *Master of Engineering Administration (School of Engineering and Applied Science).*—Application for Master's degree candidacy *must* be made by the time of registration. Completed application, required credentials, and the application fee should be sent to the Director of Engineering Admissions, School of Engineering and Applied Science, 725 23rd Street, N.W., Washington, D.C. 20006.

Admission to graduate study toward a Master's degree requires an appropriate Bachelor's degree from a recognized institution and evidence of capacity for productive work in the field selected, as indicated by undergraduate grades, Graduate Record Examination scores, and similar data.

An applicant who has significant deficiencies in preparation may be required to take prescribed undergraduate courses as an unclassified student before being admitted to graduate student status. In some cases, if such deficiencies are minimal, he may be admitted to graduate student status and allowed to take a limited number of graduate courses while completing the undergraduate courses in which he is deficient. In no case may the undergraduate courses thus taken fulfill any part of the requirements for the Master's degree.

Students wishing to apply for admission to the program of study leading to the degree of Master of Engineering Administration are required to meet the following additional admission requirements: the applicant must have an adequate knowledge of the principles of human relations, the fundamentals of accounting, and the fundamentals of statistics. This requirement can be met by satisfactory completion of the following undergraduate courses or approved equivalents: Acct 115, *Survey of Financial Accounting;* E Ad 115, *Probabilistic and Statistical Methods in Engineering;* and Psyc 145, *Psychology of Management.* A student is required to earn the grade of *C* or better (unless the requirement is stipulated to be a grade of *B* or better upon his admission) in each undergraduate prerequisite course. If this scholarship requirement is not met the student is barred from further enrollment. A student is not permitted to repeat any of the undergraduate prerequisite courses. Credit for pre-

requisite courses is not applicable toward the degree of Master of Engineering Administration.

Up to 6 semester hours of satisfactory credit (with grades of *A* or *B*), which normally must have been earned in a graduate program at another recognized institution, *may* be accepted in transfer, when applicable, to satisfy Master's degree requirements in the School of Engineering and Applied Science. However, the student must, with the approval of his adviser, petition to the appropriate department chairman for such a transfer.

READMISSION

A student who withdraws, is suspended, or is otherwise absent from the University for one semester or more, may re-enter and continue his work only under the rules and regulations in force at the time of his return. Complete and official transcripts from each institution the student has attended since making his previous application must be sent to the appropriate office at this University before his application for readmission can be evaluated.

When there are curriculum changes in graduate programs in the School of Government and Business Administration, the readmitted student may be required to take additional course work in preparation for the Master's Comprehensive Examinations.

Registration

OFF-CAMPUS REGISTRATION is conducted before or at the first class meeting of each course, at times and places stated in the *Off-campus Schedule of Classes*, available well in advance of each semester.

Registration in an off-campus course ***constitutes admission to that course only***. It does not admit the student to campus courses or to degree candidacy. Only students admitted to degree candidacy may enroll as full-time students (for 12 semester hours or more). Those who have been graduated from high school recently and wish to be *full-time freshman* students at this University should apply for admission to the appropriate college or school on campus.

Auditing.—With the permission of the instructor, students may register as "Auditors." An auditor is not required to take active part or to take examinations; he receives neither grades nor credit. Tuition is the same for the auditor as for the student registered for credit. With the approval of the Dean, a student may change from credit to audit status during the first third of the semester. A student who takes a course as an auditor may not repeat it later for credit.

Concurrent Registration.—A student registered as a degree candidate in any other college or school of the University may take credit courses in the College of General Studies *only by permission (granted prior to registration) of the dean* of the college or school concerned. A "College of General Studies Off-campus Concurrent Registration Permit" form must be obtained from the appropriate college or school, signed by the dean of that college or school, and presented at the time of registration in the College of General Studies.

Service personnel enrolled full time for campus courses need the permission of the Dean of the College of General Studies to register concurrently for off-campus courses.

Any student taking course work in another college or school of the University or at another institution through the Consortium of Universities of the Washington Metropolitan Area, Inc., must have the permission of his Dean.

Fees and Financial Regulations

ALL FEES should be paid by check or money order, made payable to George Washington University.

The following fees were adopted for the academic year 1971–72. (See pages 23–24 for projected tuition increases for 1972–75.

Tuition

On campus:	
Full-time undergraduate program (12 to 18 hours), each semester	$1,025.00
Part-time undergraduate program or hours in excess of 18, for each semester hour	74.00
Graduate study, for each semester hour	74.00
Off campus:*	
For each semester hour	54.00
Naval Ship Research and Development Laboratory programs, for each semester hour	74.00
ICAF programs, for each semester hour	63.00
Thesis:†	
ICAF programs, for each semester hour	63.00
Master of Arts in Education and Master of Science in Administration degree programs (other than ICAF), for each semester hour	74.00
Naval Ship Research and Development Laboratory programs, for each semester hour	74.00
NASA-Langley Research Center programs for nonemployees, for each semester hour	54.00

University Center Fee (charged only to students registered on campus, nonrefundable)

For students registered for 11 or more semester hours on campus:	
For each semester	37.50
For students registered for less than 11 semester hours in a semester on campus:	
For each semester hour for which the student registers	3.50
For on-campus degree candidates maintaining "continuous registration" status:	
For each semester	3.50

Special Fees

Application fee (degree candidate), nonrefundable	25.00
Graduation fee, due and payable at the time of registration for the last semester or summer session	25.00

* Except ICAF and Naval Ship Research and Development Laboratory programs.

† Payment of tuition for a Master's thesis entitles the candidate, during the period of registration, to the advice and direction of the member of the faculty under whom the thesis is to be written. In case a thesis is unfinished, additional time may be granted in accordance with the regulations of the school in which the student is registered. (See page 32 for regulations governing military leave.)

Continuous Registration fee, *off-campus degree candidates*, to maintain "continuous registration" during any semester of absence from the University*	$54.00
Continuous Registration fee, *on-campus degree candidates and degree candidates in the Naval Ship Research and Development Laboratory programs*, to maintain "continuous registration" during any semester of absence from the University or after completion of tuition requirements*	74.00
Continuous Registration fee, *ICAF degree candidates*, to maintain "continuous registration" during any semester of absence from the University*	63.00
Late-registration fee, for failure to register for campus courses within the designated period	15.00
Fee for binding two copies of the Master's thesis (other than ICAF programs)	10.00
Fee for binding two copies of the Master's thesis (ICAF programs)	7.00
Late-payment fee, for failure to make payments when due (see "Payment of Fees," pages 24–25)	15.00
On-campus financial reinstatement fee, for reinstatement after financial encumbrance for nonpayment of fees (see "Payment of Fees," pages 24–25)	35.00
Off-campus financial reinstatement fee, for reinstatement after financial encumbrance for nonpayment of fees (see "Payment of Fees," pages 24–25)	15.00
Returned check fee, charged a student whose check is returned because of insufficient funds or improper drafting	15.00
Fee for each examination to waive a curriculum requirement	5.00
Validating Examination fee	108.00
Transcript fee, charged for each transcript of record	2.00

PROJECTED TUITION INCREASES 1972-1975

Projected increases for the academic years 1972–73, 1973–74, and 1974–75 have been estimated as follows:

On Campus

Increase by year (full-time undergraduate students):

1972–73	$150.00
1973–74	150.00
1974–75	75.00

Increase by semester hour (graduate and part-time undergraduate students):

1972–73	$6.00
1973–74	6.00
1974–75	4.00

Off Campus

Increase by semester hour (except ICAF and Naval Ship Research and Development Laboratory programs):

Course Work Other than Thesis

1972–73	6.00
1973–74	3.00
1974–75	4.00

* Payment of the continuous registration fee entitles the student who is granted leave of absence to return and continue his work toward a degree under the academic requirements which were in force at the time of his first registration. The continuous registration fee applies toward neither tuition fee nor residence requirements for the degree. This fee does not apply to students granted military leave (see page 32).

Thesis for Master of Arts in Education and *Master of Science in Administration programs*

1972–73	$6.00
1973–74	6.00
1974–75	4.00

Thesis for NASA-Langley Research Center programs for nonemployees

1972–73	6.00
1973–74	3.00
1974–75	4.00

Increase by semester hour (ICAF programs including thesis):

1972–73	5.00
1973–74	5.00
1974–75	4.00

Increase by semester hour (Naval Ship Research and Development Laboratory programs including thesis):

1972–73	8.00
1973–74	6.00
1974–75	4.00

Every effort will be made to keep tuition increases within the above limits. However, it is not possible to project future economic data with certainty, and circumstances may require an adjustment of these estimates.

PAYMENT OF FEES

OFF-CAMPUS COURSES

Fees for each semester are due and payable in full at the time of each registration; however, a student registering for a *twelve-week credit course* may sign a contract at each registration to make payments in three equal installments—one-third at the time of registration, one-third by October 13, 1971, and one-third by November 13, 1971 (for the fall semester); and one-third by February 24, 1972, and one-third by March 24, 1972 (for the spring semester). Payments are due at the stipulated times. Payment envelopes are provided by the College; the University will not obligate itself to notify students of payments due.

Students receiving partial government tuition assistance must pay their portion of the tuition in full at the time of registration.

Tuition and fees for credit courses lasting less than twelve weeks, and for all noncredit courses, are payable in full at registration.

Students who fail to make any payment when due will be automatically charged a $15 late-payment fee. Accounts which become 30 days past due will be financially encumbered and will be subject to an interest charge of 8 per cent per annum. In the event a student's account is financially encumbered, the student forfeits his rights to the use of deferred payment contracts in future semesters, and the Student Accounts Office will notify the Registrar to withhold grades, future registration privileges, transcripts, diplomas, and other academic information until the account is settled financially. Financial settlement will require payment in full of all amounts due the University in addition to a financial reinstatement fee of $15.

Students auditing courses are subject to all fees charged to students registered for credit.

CAMPUS COURSES

No student is permitted to complete registration or attend classes until all charges are paid. Tuition and fees for each semester are due and payable in full at the Office of the Cashier at the time of each registration. Checks and postal money orders should be made out to George Washington University.

The Student Accounts Office has responsibility for billing and maintaining student accounts for tuition, various fees, and room and board charges. A student registered for 6 semester hours or more may sign a deferred payment contract with the Student Accounts Office at the time of each registration permitting him to pay one-half of the total tuition and fees (except for fees payable in advance) at the time of registration and the remaining half on or before November 3, 1971 (for the fall semester), and March 15, 1972 (for the spring semester). Interest at the rate of 8 per cent per annum on the unpaid balance will be charged from the date of registration to the date payment is made. The University will not obligate itself to notify the student, in advance, of the payment-due date for the second half of the semester charges.

Students receiving tuition assistance in the form of scholarships, government tuition contracts, or other forms of tuition awards are not permitted to sign deferred payment contracts unless the total tuition and fee charges exceed the value of the tuition awards by $465 or more. Under such circumstances the student may be permitted to pay one-half of the amount due from the student at the time of registration and to defer the balance by signing a deferred payment contract.

Students who fail to make any payment when due will be automatically charged a $15 late-payment fee. Accounts which become 30 days past due will be financially encumbered and will be subject to an interest charge of 8 per cent per annum. In the event a student's account is financially encumbered, the student forfeits his rights to the use of deferred payment contracts in future semesters, and the Student Accounts Office will notify the Registrar to withhold grades, future registration privileges, transcripts, diplomas, and other academic information until the account is settled financially. Financial settlement will require payment in full of all amounts due the University in addition to a financial reinstatement fee of $35.

Students auditing courses are subject to all fees charged to students registered for credit.

REFUND OF FEES

Applications for withdrawal from the University or for change in class schedule must be made in person or in writing to the dean of the college, school, or division in which the student is registered. Notification to an instructor is not an acceptable notice.

Refunds are granted only during the fall and spring semesters; no refunds are granted during the summer sessions. In authorized withdrawals and changes of schedule, cancellations of semester tuition charges and fees will be made in accordance with the following schedule:

Complete withdrawal from the University:

FALL SEMESTER

Withdrawal dated on or before September 17, 1971.....90 per cent
Withdrawal dated September 20 to October 1, 1971.....75 per cent

Withdrawal dated October 4 to October 15, 1971.....50 per cent
Withdrawal dated after October 15, 1971.....none

SPRING SEMESTER

Withdrawal dated on or before January 28, 1972.....90 per cent
Withdrawal dated January 31 to February 11, 1972.....75 per cent
Withdrawal dated February 14 to February 25, 1972.....50 per cent
Withdrawal dated after February 25, 1972.....none

2. For a *change in status from full-time to part-time student* or for *partial withdrawal by a part-time student*, the above schedule applies to the difference in charges between the original program and the adjusted program continuing in effect.
3. A student enrolled in a full-time program who drops or adds a course and continues to be in a full-time program will have no financial adjustments of tuition made other than those involving course fees.
4. A student who is granted military leave before completing the semester will receive credits for current charges in accordance with the schedule for complete withdrawal from the University (see No. 1, pages 25–26). Payments made in excess of the nonrefundable balance will be refunded to the student. The nonrefundable balance will be maintained as a deferred credit for use by the student when he returns to the University (see "Military Leave," page 32).

In no case will tuition be reduced or refunded because of absence from classes.

Payment applies only to the semester for which a registration charge is incurred and will not be credited to another semester (exception: students granted military leave, see page 32).

Authorization to withdraw and certification for work done will not be given a student who does not have a clear financial record.

Regulations

CAMPUS STUDY

OFF-CAMPUS DEGREE CANDIDATES may register for campus courses approved for their programs if these courses are not conveniently available at off-campus centers. Students must notify the Office of Student Records, College of General Studies, telephone 676-7017, at least two weeks prior to the date of campus registration so that a registration packet may be prepared. Packets may be picked up by the student at the University Library prior to and during registration.

A student may register for on-campus courses as a nondegree student in the Division of University Students.

ACADEMIC WORKLOAD

Only students admitted to degree candidacy may enroll as full-time students, i.e., for 12 or more hours in a semester. Students taking course work to qualify

for degree candidacy who are registered in this College may not take more than 10 hours in a semester.

A full-time undergraduate student who is not on probation may not ordinarily take more than 17 semester hours. A student employed more than 20 hours a week, who is not on probation, may not take more than 10 hours.

A full-time undergraduate student who is a candidate for a degree in the School of Government and Business Administration and whose quality-point index is 3.50 or higher may not take more than 18 hours. An employed undergraduate student who meets the same standard may not take more than 12 hours.

A full-time undergraduate student who is a candidate for a degree in Columbian College of Arts and Sciences and who during the immediately preceding semester has received no grades below High Pass and has earned Honors grades in three courses totaling at least 9 semester hours may take 18 or 19 hours. An employed undergraduate student who during the immediately preceding semester has no grades below High Pass and has earned grades in two courses totaling at least 6 semester hours may not take more than 12 hours.

A student on probation normally may not take more than 3 semester hours.

A student who accepts employment after registration or at any time during a semester must report that fact immediately to the Dean so that his program may be adjusted, if necessary.

A full-time graduate student who is a candidate for a degree in the School of Government and Business Administration may not take more than 12 semester hours. A graduate student who is employed more than 20 hours a week may not take more than 6 hours.

A full-time student in the Graduate School of Arts and Sciences registers for 9 to 12 semester hours each semester; a part-time student registers for a minimum of 6 semester hours each semester. These requirements do not apply when a student has fewer than 9 semester hours (full-time) or 6 semester hours (part-time) remaining to complete his program. No more than 15 semester hours may be taken during any one semester.

ATTENDANCE

A student may not attend classes until registration is completed and fees due are paid. He may attend only those classes for which he is registered.

In a fifteen-week course in which classes meet once a week, *one* unexcused absence is permitted. In a fifteen-week course in which classes meet twice a week, *two* unexcused absences are permitted. In an eight-week course meeting twice a week, *one* unexcused absence is permitted. Minimum absences per se will not be used as the sole reason for failing a course. It is the University policy that students attend courses regularly.

Excuses must be made by written application to the instructor, or by verbal permission later confirmed in writing. The student is held responsible for all course work.

EXAMINATION FOR WAIVING CURRICULUM REQUIREMENTS

During the first full semester of undergraduate degree candidacy, a student wishing to omit a required course may, with the permission of the faculty adviser, take a waiver examination, the passing of which relieves him of the

curriculum requirement and qualifies him for registration in an advanced course. *Passing of the waiver examination does not entitle the student to credit toward a degree.* The fee for each 3-hour course examination is $5.

SCHOLARSHIP

GRADES

Grades are mailed to the student through the Office of the Registrar at the close of each semester. They are not given out by instructors or the administrative staff.

UNDERGRADUATE

Columbian College of Arts and Sciences.—The following grading system is used: *H*, Honors; *HP*, High Pass; *P*, Pass; *F*, Fail; *I*, Incomplete; *W*, Authorized Withdrawal. Except for courses which specifically state that repetition for credit is permitted, a student may not repeat for credit a course in which he has received a grade of Pass or better, unless required to do so by the department concerned. A written statement to this effect must be submitted to the Registrar by the appropriate departmental chairman.

School of Government and Business Administration.– The following grading system is used: *A*, Excellent; *B*, Good; *C*, Average; *D*, Pass; *F*, Fail; *I*, Incomplete; *W*, Authorized Withdrawal. A student may not repeat for credit a course in which he has received a grade of *D* or above.

GRADUATE

The following grading system is used: *A*, Excellent; *B*, Good; *C*, Minimum Pass; *F*, Fail; *I*, Incomplete; *CR*, Credit; *W*, Authorized Withdrawal. Except for courses which specifically state that repetition for credit is permitted, a student taking School of Education and School of Government and Business Administration courses may not repeat for credit a course in which he has received a grade of *C* or above. A student taking a Graduate School of Arts and Sciences course may repeat for credit a course in which he has received a grade of *C* or above only when permitted to do so by the department concerned, unless the course description states that the course may be repeated for credit. A written statement to this effect must be submitted for approval to the Dean's Office. It is then filed with the Registrar. A student taking School of Engineering and Applied Science courses may not repeat for credit a course in which he has received a grade of *C* or above, unless required to do so by the department concerned; a written statement requiring the student to repeat such a course for credit must be submitted to the Registrar by the appropriate department chairman.

INCOMPLETE/AUTHORIZED WITHDRAWAL

Whenever a grade has not been assigned, the symbol *I* (Incomplete) or the symbol *W* (Authorized Withdrawal) will be recorded. The symbol *I* indicates that a satisfactory explanation has been given the instructor for the student's failure to complete the required work of the course. At the option of the instructor, the grade of *I* may be recorded if a student, for reasons beyond his control, is unable to complete the work of the course, and if the instructor is

informed of, and approves, such reasons before the date when grades must be reported. The grade may be used only if the student's prior performance and class attendance in the course have been satisfactory. Any failure to complete the work of a course which is not satisfactorily explained to the instructor before the date when grades must be turned in will be graded *F*. If acceptable reasons are later presented to the instructor, he may initiate an appropriate grade change. Although the grade of *I may* remain on the records for a maximum of one year, the instructor should normally set a much briefer period within which the uncompleted work (usually the final examination, or a required paper) must be made up. The grade of *I* cannot be removed by reregistering for the course here, or by taking its equivalent elsewhere. An "Incomplete" cannot be made up after the lapse of one calendar year except by written permission of the appropriate dean. An Incomplete which is not removed within one calendar year is automatically changed to an *F*.

QUALITY-POINT INDEX

Quality points are computed from grades as follows:

For each semester hour of the letter grade—*A*, 4 points; *B*, 3 points; *C*, 2 points; *D*, 1 point; *F*, no points.

Scholarship is computed in terms of the quality-point index. This is done by dividing the total number of quality points by the total number of semester hours for which the student has registered. Example: if a student received an *A* in one three-credit course, and a *B* in another three-credit course, he would compute his quality-point index this way.

$A = 4 \times 3$ (semester hours) $= 12$
$B = 3 \times 3$ (semester hours) $= 9$

6 $\qquad 21 \div 6 = 3.5$ quality-point index

Courses marked *W*, *I*, or *CR* are not considered in determining the index, except that courses marked *I* will be considered when a formal grade is recorded. Grades in courses taken at other institutions are not considered in computing the quality-point index.

WARNINGS

At stated intervals during the academic year students who are doing work of *D* grade or lower (School of Government and Business Administration) or students who are doing unsatisfactory work (Columbian College of Arts and Sciences) in courses with departmental numbers below 100 receive "warnings." A "warning" constitutes notice to the student that he must consult his instructor and his adviser at the earliest opportunity. "Warning periods" are established during the seventh and eighth weeks of fifteen-week courses, and during the third and fourth weeks of eight-week courses.

PROBATION

Undergraduate Probation in the School of Government and Business Administration.—A student must maintain a quality-point index of at least 2.00 or be placed on probation.

A student who has attempted 12 or more semester hours of work and whose cumulative quality-point index is between 1.50 and 2.00 is placed on probation for the period in which he attempts 12 additional semester hours of work. If his quality-point index is still below 2.00 at the end of his probationary period, he is suspended. The Committee on Scholarship reserves the right to extend the period of probation even if the student has earned an average of above 2.00. A student placed on probation for a third period, whether successive or after an interval, is suspended.

Undergraduate Probation in Columbian College of Arts and Sciences.—A student who is not suspended or on probation is considered to be in good standing. A student* who in one semester receives two grades of Fail in courses carrying 3 or more semester hours of credit each, or the equivalent, is placed on probation. A student on probation who receives one grade of Fail in such a course will be continued on probation for a second semester. A student on probation taking 12 or more semester hours whose grades are all Pass or better is removed from probation.

Graduate Probation in the School of Government and Business Administration.—A student who has attempted 6 or more semester hours and whose quality-point index is between 2.50 and 3.00 is placed on probation for the period in which he attempts 12 additional semester hours of work. If his quality-point index is still below 3.00 at the end of his probationary period, he is suspended. If, after probation is removed, a student's quality-point index again falls below 3.00, he is suspended.

SUSPENSION

Undergraduate Suspension in the School of Government and Business Administration.—A student who has attempted 12 or more semester hours of work and whose cumulative quality-point index is below 1.50 is subject to suspension; however, a student who has a quality-point index between 1.40 and 1.50 is considered by the Committee on Scholarship, which may retain him on probation or suspend him. A student who has attempted 6 or more semester hours of work and has a quality-point index of 1.00 or below is suspended.

Undergraduate Suspension in Columbian College of Arts and Sciences.—A student* who in one semester receives grades of Fail in three courses carrying 3 or more semester hours of credit each, or the equivalent, is suspended. A student on probation who receives two or more grades of Fail in such courses is suspended. A student who receives one or more grades of Fail in such courses in a second semester of probation is suspended.

An undergraduate student who is subject to probation for the third time, whether successive or after an interval, is suspended.

An undergraduate student suspended for poor scholarship cannot register for courses even as an auditor. He may apply for readmission after the lapse of either the fall or the spring semester. He must then submit evidence to the

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* The rules governing probation and suspension are applicable as stated to students enrolled for a full-time program (12 semester hours or more) during the fall or spring semester. Students enrolled for less than 12 semester hours during the fall or spring semester and students enrolled during the summer sessions are subject to probation or suspension on the basis of their record for 12 semester hours, or multiples thereof, rather than on their record in any one semester.

Committee on Scholarship that he is better qualified to pursue college work. A student suspended twice for poor scholarship will not be readmitted.

Graduate Suspension in the School of Education.— A student who receives the grade of *C* in more than 6 semester hours of work is subject to suspension. A student who receives a grade of *F* must confer with the Dean of the School of Education before enrollment for further work.

Graduate Suspension in the School of Government and Business Administration.—A student who has attempted 6 or more semester hours of work and whose cumulative quality-point index is below 2.50 is suspended.

CHANGES IN PROGRAM OF STUDIES

DROPPING A COURSE OFF CAMPUS

A course may be dropped without academic penalty during the first third of the semester. Withdrawing from a course without academic penalty after the first third of the semester requires approval of a written request, which should be addressed to the Dean of the College of General Studies.

Procedure for Dropping Courses.—An off-campus drop slip (obtainable from the instructor, or University representatives at the College of General Studies) must be completed, signed and dated by the instructor, and submitted to the College of General Studies.

Failure to follow the proper procedure will result in an automatic grade of *F* and, regardless of the time of discontinuance, will not relieve the student of financial responsibility for the entire course.

DROPPING A CAMPUS COURSE

A *campus* drop slip (available at the Office of the Registrar) must be completed, signed and dated by the instructor, and submitted to the Office of Student Records, College of General Studies.

Each college and school of the University sets deadline dates for each semester concerning withdrawal.

All charges for courses dropped without the approval of the dean must be met by the student. Reporting the dropping of a course to an instructor does not constitute an official withdrawal.

TRANSFER WITHIN THE UNIVERSITY

Transfer of residence to the College of General Studies, as a degree candidate, from another college, school, or division of the University may be made only with the approval of the deans concerned. Applications for transfer are available at the University's Office of Admissions or at the office of the appropriate dean. Upon transfer the student should consult his faculty adviser as to the requirements he must fulfill.

A maximum of 42 semester hours is transferrable toward the Associate in Arts in General Studies degree; a maximum of 90 semester hours is transferrable toward a Bachelor's degree; a maximum of 18 semester hours is transferrable toward a Master of Science in Administration degree; and a maximum of 6 semester hours is transferrable toward the degree of Master of Arts in Special Studies or Master of Science in Special Studies. Students trans-

ferring within the University are advised to note the residence requirements of the degree sought.

CREDIT

Credit toward a degree is given only after registration for and satisfactory completion of the required work of courses in the University, or upon the granting of advanced standing in accordance with the regulations of the College.

For transfer from credit to audit status, see page 21.

BALANCE SHEET

On request, the Registrar will issue to undergraduate degree candidates a balance sheet showing the amount of work completed and the requirements remaining to be met for the degree. A second balance sheet will be issued only in the event the student changes major or degree objectives.

TRANSCRIPTS OF RECORD

Official transcripts of student records will be issued on request of the student or former student. A fee of two dollars is charged for each transcript. No certificate of work done will be issued for a person who does not have a clear financial record.

CONTINUOUS REGISTRATION

Degree candidates are expected to maintain continuous registration until *all* degree requirements are satisfied (for "Leave of Absence" exception granted by the Graduate School of Arts and Sciences, see pages 53–54). Students who have completed course registration (including the thesis) must maintain continuous registration by paying the "continuous registration" fee (see page 23). By failing to register for one semester or more, the student breaks his registration and must be readmitted (see "Readmission," page 21). A "Readmitted Student" is required to satisfy the curriculum requirements existing at the time of his readmission. The maintaining of continuous registration normally is limited to a period of one year.

Students must be registered during the summer if they are taking courses, are taking required examinations, are receiving guidance toward theses, or are expecting to graduate at the end of the Summer Sessions.

MILITARY LEAVE

A student called to active duty may be granted military leave for the period of active duty, upon presentation to his dean of a copy of his orders and a petition for such leave. The maintenance of "continuous registration" is not required of the student on military leave; however, he must apply for readmission to the University well in advance of the semester in which he expects to return. Payments for tuition and fees which are not refunded to the student at the time he is granted military leave will be maintained as a deferred credit for his account and use upon return to the University.

GRADUATION REQUIREMENTS

To be recommended for graduation a student must have met the admission requirements of his college or school; completed satisfactorily the scholarship, curriculum, residence, and other requirements for the degree for which he is registered; and be free from all indebtedness to the University. Registration, either for course work or on the "continuous registration" fee basis, is required for the semester or summer session immediately preceding the awarding of the degree. For the Military Cooperative programs, which are on a different academic year schedule, registration in the last semester of the academic year of the program fulfills this requirement.

Application for Graduation.—An "Application for Graduation" form *must* be filed and the appropriate fee paid at the time of registration for the last semester or summer session of the senior or final year. Students completing degree requirements during the Summer Sessions will be awarded diplomas (no formal convocation) September 30, *provided* they have completed all degree requirements and have applied for graduation as a part of registration for the Summer Sessions.

Scholarship.—The student must meet the scholarship requirements for the particular degree for which he is registered.

Curriculum.—See the requirements for the degree concerned.

Residence.—A student is "in residence" only when registered for course work after making application for admission to degree candidacy or for the 15 semester hours undertaken to qualify for degree candidacy (see the specific residence requirements for the degree concerned).

With the permission of the appropriate dean, a student may be granted leave of absence; such student should, however, remain technically in residence by paying the continuous registration fee for each semester he is absent (for exception granted by the Graduate School of Arts and Sciences, see pages 53–54). For the purpose of this regulation, the summer session is disregarded.

Except for Master's degree candidates in the Graduate School of Arts and Sciences, the School of Education, and the School of Engineering and Applied Science, service personnel who receive military transfers when they are within 6 hours of a degree may, by special arrangements, be permitted to complete their work elsewhere, transfer these credits to the College of General Studies, and receive a degree from this University. This procedure does not apply to Master's candidates who have been granted 6 hours of transferred credit or have not completed the required courses.

Attendance and Conduct.—The University reserves the right to refuse to confer a degree upon a candidate whose attendance or conduct has been unsatisfactory.

Thesis.*—A thesis, submitted in partial satisfaction of requirements for the Master's degree, must be submitted in its final form to the appropriate dean no later than the date specified in the calendar. Two complete copies of each thesis are required. It is the responsibility of the candidate for a graduate degree to obtain from the College of General Studies a printed copy of the regulations governing the styling and reproduction of the thesis. These regulations are rigidly enforced (see pages 55–56).

*Applicable only to programs in the School of Government and Business Administration. See page 54 for *Thesis* in the School of Engineering and Applied Science, page 52 for *Thesis* in the School of Education

Accepted theses, with accompanying drawings, become the property of the University and are deposited in the University Library, where the duplicate copies are bound and made available for circulation. Permission to publish or adapt material in them must be secured from the Dean.

HONORS

Dean's List.—To be eligible for inclusion on the Dean's List, a student must be a candidate for an undergraduate degree. Course work taken while the application for admission is being processed will be computed in determining eligibility for the Dean's List. A full-time degree candidate in the School of Government and Business Administration programs must have a minimum quality-point index of 3.50 for the semester concerned; a part-time degree candidate must have a quality-point index of 3.50 on the last 12 semester hours of work and must have maintained continuous registration for at least one three-hour course during the period concerned. Eligibility for inclusion again will be determined on the basis of the subsequent 12 semester hours of work. In Columbian College of Arts and Sciences degree programs, a student must have received grades of Honors in at least 60 per cent of the last 15 semester hours of work and no Fail grades.

With Distinction.—The undergraduate degrees may be conferred "With Distinction," at the discretion of the Dean's Council of the College and the Committee on Scholarship if a student meets the following qualifications: in the School of Government and Business Administration programs he must attain a quality-point index of 3.50 or higher on all work taken at this University, or in Columbian College of Arts and Sciences programs he must have received grades of Honors in at least 60 per cent of the courses taken at this University.

To be eligible for this honor a student must have completed at this University at least one-half of the course work required for the degree.

Special Honors.—Special Honors may be awarded to any member of the graduating class for outstanding achievement in the student's concentration of work on recommendation of the major department, under the following regulations:

1. The student must have his candidacy for Special Honors approved by the faculty member representing the major department or concentration no later than the beginning of the senior year.

2. The student must meet such other conditions as may be set at the time his candidacy is approved.

3. No student will be awarded Special Honors unless he meets the following qualification: in the School of Government and Business Administration programs he must have achieved a quality-point index of at least 3.00 on all work taken at this University, or in Columbian College of Arts and Sciences programs he must have earned High Pass or Honors grades in 50 per cent of the courses taken at this University.

4. To be eligible for honors a student must have completed at this institution at least one-half of the academic course work required for the degree.

DISHONESTY

If a student knowingly makes a false statement or conceals material information on an application for admission, registration card, or any other University

document, his registration may be cancelled. If such falsification is discovered after the student has established an academic record at the University, he may be subject to dismissal from the University. Such a student will be ineligible (except by special action of the Dean's Council) for subsequent registration in any unit of the University.

Academic dishonesty on the part of any student will result in a disciplinary grade of *F* for the course involved and also may, upon the recommendation of the Dean's Council, result in his suspension from the University for a stated period, at the end of which time he may petition for readmission. Upon approval of the Dean's Council, the disciplinary grade of "Failure—Academic Dishonesty" will be recorded for the course involved, and this grade will be employed in the computation of the quality-point index or academic standing. A student so suspended shall be withdrawn from all other courses except those in which all work has been completed.

THE LIBRARY

A student registered in the College of General Studies is entitled to the use of the University Library. A permit form for library privileges is issued to each student. A borrower's card may be obtained by presenting the permit form at the Circulation Desk of the Library.

The loan period for most books available for outside circulation is 30 days. A fine of 25 cents is charged for each day a book is overdue. Any book which circulates is subject to recall by the Library if needed for reserve or other use. Reserve books must be used in the reserve reading room when the Library is open, except that they may be withdrawn for overnight use beginning at 8:30 p.m. A fine of 50 cents is charged for each hour or fraction thereof that a reserve book is overdue. Grades of a student are withheld until his library record is clear.

All students using the University Library are expected to be familiar with its detailed regulations, available on application to any of the Library's Service desks.

The hours of the University Library are Monday through Friday, 8:30 a.m. to 12 midnight; Saturday, 9 a.m. to 10 p.m.; Sunday, 1 p.m. to 12 midnight.

RIGHT TO DISMISS STUDENTS

The right is reserved by the University to dismiss or exclude any student from the University, or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable to do so.

RIGHT TO CHANGE RULES

The University and its various colleges, schools, and divisions reserve the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

RIGHT TO MAKE CHANGES IN PROGRAMS

The right is reserved by the University to make changes in programs without notice whenever circumstances warrant such changes.

RECENTLY ESTABLISHED REGULATIONS

An Appendix (pages 146–47) contains regulations recently approved by the University's Board of Trustees.

UNIVERSITY POLICY ON RELEASE OF STUDENT INFORMATION

In general, the policy of the University is one of attempting to keep the student's record confidential and out of the hands of those who would use it for other than legitimate reasons. At the same time, the policy must be flexible enough not to hinder the student, the University, or the community in their legitimate endeavors.

No information concerning a student will be released except as noted below:

1. Information such as whether or not the student is currently enrolled; dates of attendance; verification of date and place of birth; degrees earned, if any, date, major field or area of concentration, and honors received; home and local addresses and telephone numbers; school, college, or division of enrollment, and class; verification of signature; name and address of parent or guardian.

2. The issuance of formal transcripts of record to recognized institutions of higher learning; the certification of academic achievement to the various recognized professional associations (law, medicine, engineering, education, etc.).

Additional information will be released only on written authorization from the student, or by court order or subpoena. If a subpoena is served, the student whose record is being subpoenaed will be notified and the subpoena will be referred to the University's legal counsel.

Government investigative agencies have no inherent right to access to student files and records. If expressly requested, properly identified representatives from federal, state, or local government agencies may be given the information listed under No. 1 above.

UNIVERSITY POLICY ON SELECTIVE SERVICE INFORMATION

The University notifies draft boards of a student's academic status only when the student requests or authorizes, in writing, that the draft board be notified. A Selective Service Information Card is put into the registration packet of each male student who has not reached his 26th birthday, registered on campus, exclusive of those in the National Law Center and the School of Medicine. This card contains the following statement:

> By my signature below, I hereby authorize the University to notify my draft board of my academic status in the University, or of any changes in academic status that occur during this semester.

If the student signs the card, the University then automatically notifies the draft board. If the student does not sign the card, no notification is sent. National Law Center students and students in the School of Medicine should check with the appropriate dean's office for details of the policy in their school.



Counselor Mrs. Elaine Lozier (r.), and members of secretarial staff help students through registration procedures at College of General Studies reception desk.

HONOR SOCIETIES

Alpha Sigma Lambda.—A National honor society for part-time evening college and off-campus undergraduate degree students, the purpose of which is to recognize and to encourage scholarship and leadership among undergraduate degree candidates. Membership is limited to students who have been enrolled for four semesters or terms in the College of General Studies and have completed 30 semester hours of work toward a degree with a 3.50 average, or equivalent. The Alpha Alpha Chapter was established at George Washington University in 1965.

Phi Beta Kappa.—Undergraduate degree candidates in the College of General Studies programs are eligible for membership in Phi Beta Kappa, national scholarship honorary society. Students who have completed 75 semester hours of course work, at George Washington University of elsewhere, with a grade average of at least 3.40 or the equivalent will be considered.

COUNSELING

Students in the off-campus programs may obtain educational counseling and assistance in program planning through the Office of Counseling and Student Records or from University representatives at the various off-campus centers.

The Office of Counseling and Student Records coordinates student personnel services, including academic counseling, vocational guidance as related to educational programs, and liaison with other University departments and services, as well as serving as a resource center for information on tuition assistance available to students in the College of General Studies programs. Appointments may be made by calling the College of General Studies, Telephone 676-7069, or through the Education Director at locations where courses are scheduled. University counselors are also available at all locations during announced registration periods and at scheduled times each month.

UNIVERSITY BOOKSTORE

Textbooks may be ordered by mail from the University Bookstore. Forms for this purpose are available at registration. The hours of the Bookstore are Monday through Thursday from 8:45 a.m. to 6:30 p.m.; Friday from 8:45 a.m. to 5 p.m.; and Saturday, 8:45 a.m. to 1 p.m. Telephone: 676-6870.

The Bookstore is located in the Cloyd Heck Marvin Center building, 800 21st Street, N.W.

VETERANS EDUCATION

The Office of the Registrar, Luther Rice Hall, 2121 Eye Street, N.W., assists students entitled to educational benefits as veterans or war orphans with any problems which may arise concerning their benefits. This Office also processes certifications of enrollment and attendance to the Veterans Administration so that monthly allowances will be paid.

When feasible, students entitled to benefits as veterans or war orphans should consult the Office of the Registrar prior to submitting application to the Veterans Administration. All such students should obtain the instruction sheet issued by the Office of the Registrar, which sets forth requirements to be fulfilled before certification of enrollment can be made to the Veterans Administration, and which includes other information of general interest.

The Veterans Administration is at 2033 M Street, N.W., Washington, D.C 20421.

STUDENT AND ALUMNI CAREER SERVICES OFFICE

The Student and Alumni Career Services Office, Woodhull House, 2033 G Street, N.W., provides assistance to degree-seeking students and alumni seeking full-time, part-time, temporary, or permanent employment. The Office maintains a registry of positions available in many fields, both locally and nationally, and refers qualified applicants for consideration. The Office administers the on-campus Industrial and Government Recruitment Interview Program for seniors and graduate students, in which private companies, government agencies, service organizations, public school systems, and universities participate. The Office also handles the referral and placement functions of the on-campus College Work-Study Program. Prospective teachers may establish permanent credentials files in the Student and Alumni Career Services Office. This service includes files for alumni seeking college and university faculty and administrative positions. The Office also provides individual interviews for students and alumni wishing career guidance.

The Office is open from 9 a.m. to 5 p.m., Monday through Friday.

DEGREE PROGRAMS

Undergraduate Degrees

THE FACULTY of Columbian College of Arts and Sciences has academic jurisdiction over the degrees of Associate in Arts in General Studies; Bachelor of General Studies with areas of concentration in history, mathematics, political science, and psychology; Bachelor of Science in Environmental Health; Bachelor of Science in Geodetic and Cartographic Science; and Bachelor of Science in Oceanography. The Faculty of the School of Government and Business Administration has academic jurisdiction over the degree of Bachelor of Science in Administration with areas of concentration in accounting and business administration. These off-campus programs are administered by the College of General Studies.



Directors of Credit Programs staff meet with Associate Dean Alvin C. Jensen (at desk). Directors are (clockwise from Dr. Jensen) Jack B. Fergerson, D.C. Credit Programs; Joseph E. Johnston, Counseling and Student Records; Edson G. Hammer, Maryland Credit Programs; William F. Lanier, Virginia Credit Programs; John H. McCalla, Administration; and John Morrow, Teacher Education.

ADMISSION

For detailed information see "Admission as a Degree Candidate," page 17, and "Undergraduate Degree Candidacy," pages 17–19.

REQUIREMENTS FOR THE ASSOCIATE IN ARTS IN GENERAL STUDIES DEGREE

RESIDENCE

The last 18 semester hours in the Associate in Arts in General Studies degree program must be completed in residence as a candidate for this degree. A portion of the academic work taken to qualify for degree candidacy (see pages 17–18) may be accepted in partial satisfaction of the residence requirement, if the courses are approved as part of the student's degree program.

REQUIREMENTS FOR THE BACHELOR'S DEGREES

RESIDENCE

The last 30 semester hours, including at least 12 hours in the area of concentration, must be completed in residence as a candidate for the degree sought, unless special permission is granted by the appropriate dean to take work elsewhere. This requirement applies to students transferring within the University as well as to students transferring from other institutions. Summer work and the 15 hours taken in order to be considered for degree candidacy may be counted in residence, but in no case may the period of residence aggregate less than 30 weeks. For regulations governing military students who are transferred when they are within 6 semester hours of their degrees, see page 33.

Transfers.—Transfer students from other colleges or universities must complete satisfactorily at least 12 semester hours of the required work in their area of concentration in residence as a candidate for the degree sought.

ASSOCIATE IN ARTS IN GENERAL STUDIES

Faculty Adviser: Joseph E. Johnston, College of General Studies; Building F, Room 15A, Telephone: 676-7016.

Upon the satisfactory completion of the requirements set by Columbian College of Arts and Sciences, the degree of Associate in Arts in General Studies is conferred. Students who plan to continue working toward an off-campus Bachelor's degree offered by Columbian College must apply to the Dean upon completion of the requirements for the degree of Associate in Arts in General Studies. Forms for this purpose are available at the College of General Studies.

After completing the requirements for the degree of Associate in Arts in General Studies, students may wish to transfer to an on-campus degree program within the University, or they may wish to transfer to another institution. However, modifications in admission, advanced standing, and curriculum requirements permitted in the Associate in Arts in General Studies degree program may not be accepted in transfer. Therefore, while registered for this degree, students should meet the requirements of the college, school, or uni-

versity to which they wish to transfer. The entrance requirements of the colleges and schools of the University are stated in this catalogue and in the *Undergraduate and Graduate Catalogue* of the University.

Scholarship.—The system of grading is described on pages 28–29. For regulations concerning probation, suspension, and readmission, see pages 29–31.

CURRICULUM

The satisfactory completion of 60 semester hours of college work in the following curriculum, is required. Students who plan to pursue a Bachelor's degree are advised to plan their Associate's program so that they will meet the prerequisite requirements of the degree of their choice.

	Semester Hours
Communications	
Engl 1 or 1x, 2	6
Sp&D 1 or 111	3
Humanities	
Hum 1–2, 3–4 or Nine semester hours selected from the following: Art 31–32, 71–72; Engl 41–42, 51–52, 71–72, 91–92; Mus 3, 4; Phil 61–62; Rel 9, 10, 59–60	9
Natural Science or Mathematics	
Nine semester hours selected from the following: B Sc 3–4, 11–12; Chem 3–4; Geol 1–2, 3, 4; Phys 1, 2, 9–10; Math 3, 6, 9, 10, 30, 31; Stat 51, 52, 101–2	9
Social Sciences	
Nine semester hours are required, each course chosen from one of two departments, selected from the following: AmCv 71–72; Anth 1–2; Econ 1–2; Geog 51 and 52; Hist 39–40, 71–72; P Sc 5–6; Psyc 1, 8, 22, 29; Soc 1–2	9
Elective (recommended Mgt 118 and 119)	24
Total	60

BACHELOR OF GENERAL STUDIES

Faculty Adviser: Joseph E. Johnston, College of General Studies; Building F, Room 15A, Telephone: 676-7016.

The Bachelor of General Studies curriculum aims to provide the adult part-time student with the opportunity to obtain a broad education. For that reason the course work required in the first and second years is distributed among Communications (written and oral), the Humanities, Natural Science and Mathematical Sciences, and the Social Sciences. In choosing the third- and fourth-

year course work required in departments related to their concentration, students should obtain counseling through the faculty adviser.

Students planning to work toward Master's degrees are advised to plan their Bachelor's programs so that they will meet the prerequisite requirements of the school or college of their choice. Students planning to enter graduate programs which require a reading knowledge of a foreign language are advised to include two years of one foreign language in their Bachelor's program.

Scholarship.—To remain in good standing and to qualify for graduation, a student must maintain grades of High Pass or Honors in half the courses taken in the selected area of concentration.

The system of grading is described on pages 28–29. For regulations concerning probation, suspension, and readmission, see pages 29–31.

FIRST AND SECOND YEARS

	Semester Hours
Communications	
Engl 1 or 1x, 2	6
Engl 11; Sp&D 111 or 121	6
Humanities*	
Hum 1–2, 3–4 or Twelve semester hours selected from the following: Art 31–32, 71–72; Engl 41–42, 51–52, 71–72, 91–92; Foreign Language (2 years of one language); Mus 3 and 4; Phil 61–62; Rel 9 and 10, 59–60; Slav 91–92	12
Natural Science	
Six to eight semester hours selected from the following: B Sc 3–4, 11–12; Chem 3–4; Geol 1–2, or 3 and 4; Phys 1 and 2, or 9–10	6–8
Mathematics	
Six semester hours selected from the following: Math 3, 6, 9, 10, 30, 31; Stat 51, 52, 101–2	6
Social Sciences	
Two full-year courses† are required, each course chosen from one of two departments, selected from the following: AmCv 71–72; Anth 1–2; Econ 1–2; Geog 51 and 52; Hist 39–40, 71–72; P Sc 5–6; Psyc 1 and 8, 1 and 22, 1 and 29; Soc 1–2	12
Elective (depending on science option)	10–12
	60

* Students who plan to continue study for advanced degrees are urged to fulfill the 2-year language option.

† Geography and Regional Science and Psychology courses listed are not full-year courses; however, if a student elects one of these options, he must elect Geog 51 and 52, or Psyc 1 and 8, or 1 and 22, or 1 and 29

THIRD AND FOURTH YEARS

Concentrations are offered in History, Mathematics, Political Science, and Psychology.

Concentration Requirements (to be selected in consultation with the faculty adviser):

	Semester Hours
100-level courses in the department of the selected area of concentration	24*
100-level courses in two or more related departments	18*
Elective	18
Total	120

BACHELOR OF SCIENCE IN ADMINISTRATION

Faculty Advisers: First two years—Joseph E. Johnston, College of General Studies; Building F, Room 15A, Telephone: 676-7016. Third and fourth years—Robert F. Hartley, Associate Professor of Business Administration; Government 400, Telephone: 676-6069.

The Bachelor of Science in Administration curriculum aims to provide the adult part-time student with the opportunity to obtain a broad education in preparation for careers in accounting or business administration. The course work required in the first and second years is distributed among Communications (written and oral), the Humanities, Natural Science and Mathematical Sciences, the Social Sciences, and Business and Economics. In choosing the third- and fourth-year course work required in departments related to their concentration, students should obtain counseling through the faculty adviser.

Students planning to work toward Master's degrees are advised to plan their Bachelor's programs so that they will meet the prerequisite requirements of the school or college of their choice.

SCHOLARSHIP

The system of grading and computing scholarship is described in detail on pages 28–29. For regulations concerning probation, suspension, and readmission, see pages 29–31.

To remain in good standing and to qualify for graduation, a student must maintain a general quality-point index of 2.00 and a quality-point index of at least 2.50 in his area of concentration.

FIRST AND SECOND YEARS

Communications	Semester Hours
Engl 1 or 1x, 2	6

*Students selecting psychology as an area of concentration are required to take 18 semester hours of 100-level Psychology courses and 24 semester hours of 100-level courses in two or more related departments.

Humanities	Semester Hours
Six semester hours selected from the following: Art 31; Engl 51–52, 71–72, 91–92; Foreign Language (1 full year of a foreign language); Mus 3; Phil 61–62	6
Natural Science and Mathematical Sciences	
Math 30, 31	6
Stat 51 or 101	3
Six to eight semester hours selected from the following: B Sc 3–4; Chem 3–4; Geog 51 and 52; Geol 1–2, or 3 and 4; Phys 1 and 2, or 9–10	6–8
Social Sciences	
Psyc 1, 8	6
Six semester hours selected from the following: Anth 1, Hist 71–72, P Sc 5–6, Soc 1	6
Business and Economics	
Acct 1–2* or 115	3–6
B Ad 51	3
Econ 1–2	6
Elective	4–9
	60

THIRD AND FOURTH YEARS

Concentrations are offered in Accounting and Business Administration.

Required Courses—Accounting Concentration	
Acct 101, 121, 161, 171, 181	15
B Ad 102, 105, 131, 141, 161, 198	18
Econ 121	3
Mgt 118	3
Psyc 144	3
Elective (To be selected from Accounting, Business Administration, or Economics)	12
Elective (To be selected in consultation with the Faculty Adviser)	6
Total	120

Required Courses—Business Administration Concentration	
Acct 193	3
B Ad 101, 102, 105, 131, 141, 161; 178 or 198	21
Econ 121	3
Mgt 118	3
Psyc 144	3
Elective (To be selected from Business Administration or related departments such as Accounting or Economics)	12

* Students selecting Accounting as an area of concentration should elect Acct 1–2.

	Semester Hours
Elective (To be selected in consultation with the Faculty Adviser)	15
Total	120

BACHELOR OF SCIENCE IN ENVIRONMENTAL HEALTH

Faculty Advisers: First two years—Joseph E. Johnston, College of General Studies; Building F, Room 15A, Telephone: 676-7016. Third and fourth years—J. W. Millar, Irvian Gill, Professor of Epidemiology and Environmental Health, School of Medicine; Telephone: 331-6117.

The Bachelor of Science in Environmental Health curriculum is designed to provide students with the requisite training to function effectively as Environmental Health Officers in domestic and foreign areas. Candidates are prepared for participation in community or regional program planning, community education, staff personnel training, and supervision in official or voluntary health organizations.

Entrance requirements are stated on pages 17–19; residence requirements on page 40.

The determination of acceptability of a student to the program leading to the degree of Bachelor of Science in Environmental Health will be made by the faculty advisers appointed by the Department of Epidemiology and Environmental Health and Columbian College of Arts and Sciences. The decision to accept a student must be unanimous. The degree is granted by Columbian College of Arts and Sciences and is administered by the College of General Studies.

Scholarship.— To remain in good standing and to qualify for graduation, a student must maintain grades of High Pass or Honors in half the courses taken in the major area of concentration.

The system of grading is described on pages 28–29. For regulations concerning probation, suspension, and readmission, see pages 29–31.

FIRST AND SECOND YEARS

	Semester Hours
Communications	
Engl 1 or 1x, 2	6
Engl 11; Sp&D 111 or 121	6
Humanities	
Hum 1–2, 3–4	
or	
Twelve semester hours selected from the following: Engl 41–42, 51–52, 71–72, 91–92; Foreign Language (2 years of one language); Phil 61–62	12
Natural Sciences	
B Sc 11–12, Chem 11–12	16
Mathematics	
Six semester hours selected from the following: Math 3, 6, 9, 10, 30, 31; Stat 51–52, 101–2	6

Social Sciences

	Semester Hours
A full-year course* in one department selected from the following: Anth 1–2; Econ 1–2; Psyc 1 and 8, 1 and 22; Soc 1–2	6
†Elective (Epid 1, 2, and 3 recommended)	8
	60

THIRD AND FOURTH YEARS

Concentration Requirements (to be selected, in consultation with the adviser, from the following Epidemiology and Environmental Health courses)	25

Environmental Sanitation—Epid 101, 102, 103, 104
Public Health Epidemiology—Epid 121, 122, 123, 131
Public Health Entomology—Epid 141, 142, 143, 144
Public Health Microbiology—Epid 151, 152, 153, 154
Occupational Health—Epid 171, 172
Public Health Administration—Epid 191, 192

Elective

100-level courses in two or more related departments in consultation with the faculty adviser, selected from Anthropology, Biological Sciences, Chemistry, Geology, Psychology, and Sociology	35
Total	120

BACHELOR OF SCIENCE IN GEODETIC AND CARTOGRAPHIC SCIENCE

Faculty Adviser: Hyman Orlin, Professorial Lecturer in Geodetic and Cartographic Science; Telephone: 946-3557. Counseling by appointment only, Telephone: 676-7013.

The course work in this four-year curriculum is offered on and off campus. The Cartography, Geodesy, Geophysics, and Oceanography courses are given at the National Oceanic and Atmospheric Administration, the Naval Oceanographic Office, the U.S. Army Topographic Command, and at other locations not too distant from the campus.

Entrance requirements are stated on pages 17–19; residence requirements are stated on page 40.

ADVANCED STANDING

Twelve semester hours of credit may be granted upon the successful completion of validating examinations. *Note that no credit will be given for courses taken in correspondence schools or service schools.*

* Psychology courses listed here are not full-year courses. However, if a student elects Psychology courses, he must elect Psyc 1 and 8 or 1 and 22.
† Electives selected with the approval of the adviser.

SCHOLARSHIP

The system of grading is described on pages 28–29. For regulations regarding probation, suspension, and readmission, see pages 29–31.

To remain in good standing and to qualify for graduation, a student must maintain grades of High Pass or Honors in half of the courses taken in one of the two areas of concentration: (1) *Cartography*—Cart 103, 104, 111, 112, Geod 110, Geop 105; (2) *Geodesy*—Geod 110, 155, 156, 160, 161, Geop 105.

CURRICULUM

	Required—First Year	Semester Hours
Engl 1, 2:	English Composition	6
Math 30:	Precalculus	3
Math 31:	Calculus of One Variable	3
Phys 1:	General Physics	4
Phys 2:	Introduction to Modern Physics	4
Social Sciences:	To be selected from the following	6
AmCv 71–72:	Introduction to American Civilization	
Anth 1–2:	Introductory Anthropology	
Econ 1–2:	Principles of Economics	
Geog 51:	Introduction to Geography	
Geog 52:	World Regional Patterns	
Hist 39–40:	European Civilization in Its World Context	
P Sc 5–6:	Introduction to Political Science	
Soc 1–2:	Introductory Sociology	
Elective:	To be selected from the following	6
Art 31–32:	Survey of Western Art	
Art 71–72:	Introduction to the Arts in America	
Mus 3:	Introduction to Musical Understanding	
Mus 4:	Survey of Music Literature	
Phil 61–62:	Introduction to Philosophy	
Rel 9:	The Old Testament	
Rel 10:	The New Testament	
Rel 21:	Introduction to Religious Thought	
Rel 59–60:	History of Religions	
	Total	32

	Required—Second Year	
Cart 1–2:	Introduction to Cartography	6
Chem 11–12:	General Chemistry	8
Engl 51–52:	Introduction to English Literature, or	
Engl 71–72:	Introduction to American Literature	6
Geod 12:	Plane Surveying	3
Geol 1 or 3:	Introductory Geology	3
Math 32:	Calculus of Several Variables	3
Math 33:	Calculus of Vector Functions	3
	Total	32

Required—Third Year

		Semester Hours
Cart 107:	Physiography	3
Geod 13:	Geodetic Surveying	3
Geod 17:	Elementary Photogrammetry	3
Geod 18:	Intermediate Photogrammetry	3
Geod 110:	Map Projections	3
Geop 105:	Elementary Geophysics	6
Ocea 101–2:	Elementary Oceanography	6
Elective:	(Selected in consultation with the adviser)	3
	Total	30

Group Options

Two areas of specialization are open to students in this program; students select one at the beginning of the fourth year.

Required—Fourth Year

GROUP I: CARTOGRAPHY		
Cart 103–4:	Photo Interpretation	6
Cart 111:	Cartographic Techniques	3
Cart 112:	Advanced Cartography	3
Elective:	(Courses in Cartography, Geodesy, Geophysics, and Oceanography selected in consultation with the adviser)	14
	Total	26
GROUP II: GEODESY		
Geod 155:	Elementary Geodesy	3
Geod 156:	Geodetic Astronomy	3
Geod 160:	Mathematics of Adjustments and Least Squares	3
Geod 161:	Adjustments in Geodesy and Photogrammetry	3
Elective:	(Courses in Cartography, Geodesy, Geophysics, and Oceanography selected in consultation with the adviser)	14
	Total	26

BACHELOR OF SCIENCE IN OCEANOGRAPHY

Faculty Adviser: Hyman Orlin, Professorial Lecturer in Geodetic and Cartographic Science; Telephone: 946-3557. Counseling by appointment only, Telephone: 676-7013.

The course work in this four-year curriculum is offered on and off campus. The Cartography, Geodesy, Geophysics, and Oceanography courses are given at the National Oceanic and Atmospheric Administration, the Naval Oceanographic Office, the U.S. Army Topographic Command, and at other locations not too distant from the campus.

Entrance requirements are stated on pages 17–19; residence requirements are stated on page 40.

ADVANCED STANDING

Twelve semester hours of credit may be granted upon the successful completion of validating examinations. *Note that no credit will be given for courses taken in correspondence schools or service schools.*

SCHOLARSHIP

The system of grading is described on pages 28–29. For regulations concerning probation, suspension, and readmission, see pages 29–31.

To remain in good standing and to qualify for graduation, a student must maintain grades of High Pass or Honors in half of the following courses: Geop 105; Ocea 101–2; and 9 semester hours selected from Ocea 110, 111, 112, 113, 114, 115.

CURRICULUM

	Required—First Year	Semester Hours
Engl 1, 2:	English Composition	6
Math 30:	Precalculus	3
Math 31:	Calculus of One Variable	3
Phys 1:	General Physics	4
Phys 2:	Introduction to Modern Physics	4
Social Sciences:	To be selected from the following	6
AmCv 71–72:	Introduction to American Civilization	
Anth 1–2:	Introductory Anthropology	
Econ 1–2:	Principles of Economics	
Geog 51:	Introduction to Geography	
Geog 52:	World Regional Patterns	
Hist 39–40:	European Civilization in Its World Context	
P Sc 5–6:	Introduction to Political Science	
Soc 1–2:	Introductory Sociology	
Elective:	To be selected from the following	6
Art 31–32:	Survey of Western Art	
Art 71–72:	Introduction to the Arts in America	
Mus 3:	Introduction to Musical Understanding	
Mus 4:	Survey of Music Literature	
Phil 61–62:	Introduction to Philosophy	
Rel 9:	The Old Testament	
Rel 10:	The New Testament	
Rel 21:	Introduction to Religious Thought	
Rel 59–60:	History of Religions	
	Total	12

	Required—Second Year	
Cart 1–2:	Introduction to Cartography	6
Chem 11–12:	General Chemistry	8
Engl 51–52:	Introduction to English Literature, or	
Engl 71–72:	Introduction to American Literature	6
Geol 1 or 3:	Introductory Geology	3
Geol 2 or 4:	Introductory Geology	3

		Semester Hours
Math 32:	Calculus of Several Variables	3
Math 33:	Calculus of Vector Functions	3
	Total	32

Required—Third Year

Cart 107:	Physiography	3
Cart 108:	Climatology	3
Geop 105:	Elementary Geophysics	3
Ocea 11:	Navigation	6
Ocea 101–2:	Elementary Oceanography	12
Elective:	(Selected in consultation with the adviser)	30
	Total	

Required—Fourth Year

Oceanography:	To be selected from the following	12
Ocea 110:	Ocean Dynamics	
Ocea 111:	Ocean Waves and Tides	
Ocea 112:	Biological Oceanography	
Ocea 113:	Marine Geophysics	
Ocea 114:	Chemical Oceanography	
Ocea 115:	Geological Oceanography	
Elective:	(Courses in Biological Sciences, Chemistry, Geology, Geophysics, Oceanography, and Physics, selected in consultation with the adviser)	14
	Total	26

Graduate Degrees

MASTER OF ARTS

THE DEGREE OF MASTER OF ARTS with a field in Religion and Medical Care is a new degree program offered by the Graduate School of Arts and Sciences under the direction of the Department of Religion. Although certain courses in this program are offered only through the College of General Studies' off-campus centers, candidates for this degree must register as a campus degree candidate in the Graduate School of Arts and Sciences.

The program of study is interdisciplinary and combines both professional and academic work. The intent of the program is (1) to provide training in an academic graduate milieu of chaplains and clergymen whose professional effectiveness might be increased through the combination of clinical experience and academic study; (2) to provide a program of study for those medical students who have a sense of the significance of theological insights for the care of the whole man and who desire to combine their medical education with this correlative study; and (3) to provide a program of research and study in

he area of religion and medical care for those whose theological training (e.g., n ethics or sociology of religion) and interest are directed toward a vocation n teaching. Support for the program comes from (1) Clinical Training programs of the National Naval Medical Center, National Institutes of Health, nd Walter Reed General Hospital; and (2) the departments of Health Care Administration, Psychology, Religion, Sociology, and departments of the School of Medicine.

The program of study leading to the degree of Master of Arts in the field f Religion and Medical Care consists of 36 semester hours of approved course ork with or without a thesis and the passing of a Master's Comprehensive Examination.

For information concerning admission requirements and the specific requirements for the degree, contact the Graduate School of Arts and Sciences or the Chairman of the Department of Religion.

MASTER OF ARTS IN EDUCATION

The School of Education has academic jurisdiction over the degree of Master of Arts in Education. This degree is designed for professional educators currently serving within a school system. The program of study is structured to prepare the graduates for advancement as administrators, supervisors, or as classroom teachers.

The Master of Arts in Education degree programs offered at off-campus centers are available in the following fields: elementary administration; elementary education; secondary administration; secondary education; special education—crisis resource teaching, diagnostic-prescriptive teaching, early childhood special education; and supervision.

ADMISSION

For detailed information see "Admission as a Degree Candidate," page 17, and "Master's Degree Candidacy," pages 19–21.

REQUIREMENTS FOR THE DEGREE

The program of study consists of either 33 or 36 semester hours of course work, depending upon the chosen field. The thesis (equivalent to 6 semester hours) is optional.

RESIDENCE

Advanced standing is granted for approved courses taken at other accredited institutions; however, a minimum of 30 semester hours must be completed while registered as a Master's degree candidate at this University.

SCHOLARSHIP

A quality-point index of 3.00 is required for graduation. Students who receive a grade of *C* in more than two courses are subject to suspension. Students who receive a grade of *F* must confer with the Dean of the School of Education before enrollment for further work.

THE THESIS

Students who elect a thesis must register on campus for Educ 299–300. The choice of the thesis subject must be approved in writing by the student's adviser and filed in the Office of the Dean. A statement of the School of Education standards for the thesis and printed copies of detailed regulations regarding the form and reproduction of the thesis are available in the Office of the Dean.

Payment of tuition for the thesis entitles the candidate, during the period of registration, to the advice and direction of the member of the faculty under whom the thesis is to be written. In case a thesis is unfinished, an additional calendar year may be granted without further tuition payment. The student must, however, maintain continuous registration (see page 32) during this period. If the preparation of the thesis extends beyond the additional calendar year, the student must register for the entire 6 hours of thesis again and pay tuition as for a repeated course.

MASTER'S COMPREHENSIVE EXAMINATION

In addition to the course examinations, the candidate must pass a special three-hour examination on his area of specialization. Candidates for the examination must be registered for the semester it is to be taken, and must file a written application in the Office of the School of Education no later than thirty days prior to the date of the examination.

MASTER OF ARTS IN SPECIAL STUDIES AND MASTER OF SCIENCE IN SPECIAL STUDIES

The Graduate School of Arts and Sciences has academic jurisdiction over the degrees of Master of Arts in Special Studies and Master of Science in Special Studies. These degree programs provide a course of study appropriate to those students who wish to emphasize interdisciplinary work.

The University cannot guarantee that all courses in these curricula will be offered at every off-campus center. However, any student who has been admitted to degree candidacy may arrange to complete his curriculum by registering on campus.

ADMISSION

For detailed information see "Admission as a Degree Candidate," page 17, and "Master's Degree Candidacy," pages 19–21.

REQUIREMENTS FOR THE DEGREES

The program of study consists of 36 semester hours of graduate work and does not require a thesis. Candidates may select courses which are offered by schools other than the Graduate School of Arts and Sciences, provided that the 36-hour total program is academically viable and is approved by the Dean of the Graduate School as part of the application process, and that a plurality of courses are within the arts and sciences curriculum. The program of studies must be approved by the Dean of the Graduate School and the departmental adviser and filed in the Graduate School Office within 30 days

after admission to degree candidacy. A program of studies may be revised, when necessary, by obtaining the approval of the Dean. The revision must be filed in the Graduate School Office.

RESIDENCE

A minimum of 30 semester hours of graduate work must be completed while registered as a degree candidate in one of the off-campus degree programs.

SCHOLARSHIP

Graduate students are expected to maintain a minimum accumulative grade average of *B* (3.00) in all course work in the program of studies. Individual departments may require a higher average.

In the case of a student who receives a grade of *F* for a course in his program of studies, the Graduate School will require a departmentally approved written statement justifying the student's continuance in the Graduate School and outlining the program to be followed. Continuation is contingent upon the Dean's approval. A course in the program of studies for which an *F* is received cannot be subsequently removed from the program even though another course is taken as a substitute.

A graduate student may take an advanced undergraduate course (courses numbered 100–200) for graduate credit only upon the approval of the Dean of the Graduate School and the department at the time of registration. Such approval is granted only with the provision that students complete additional work in order to receive graduate credit.

MASTER'S COMPREHENSIVE EXAMINATION

Master's degree candidates must pass a Master's Comprehensive Examination administered by the Graduate School of Arts and Sciences on campus on specified dates (see Calendar).

A student who fails to pass the Master's Comprehensive Examination may, in exceptional circumstances, and with the approval of the department and the Dean, repeat the Examination at the next scheduled Examination date. If he fails a second time, no further opportunity to take the Examination is permitted.

WITHDRAWAL

Graduate students who intend to withdraw from the Graduate School of Arts and Sciences should inform the School in writing. The last day for complete withdrawal without academic penalty is at the end of the eighth week of classes.

LEAVE OF ABSENCE

If a student is temporarily unable to continue his program of studies, he may request leave of absence for a specific period of time, not to exceed one calendar year. When the period of leave has expired, it is the student's responsibility to notify the Graduate School at least two months in advance of a

given registration period of his intention to reregister. If he fails to reregister, his candidacy will be terminated.

MASTER OF SCIENCE IN ADMINISTRATION

The School of Government and Business Administration has academic jurisdiction over the degree of Master of Science in Administration. This degree program provides a course of study appropriate for those students currently working in government or industry. It is a professional degree, preparing graduates for positions of higher and broader responsibility and generally improving their competence as administrators. Students expecting to continue in a doctoral program should consult the Committee on Doctoral Studies in the School of Government and Business Administration concerning necessary prerequisites.

The University cannot guarantee that all courses in this curriculum will be offered at every off-campus center. However, any student who has been admitted to degree candidacy may arrange to complete his curriculum by registering on campus. In general, campus registration is *limited to the last 12 hours of a degree program*.

OBJECTIVES OF THE SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION

The principal objective of the School of Government and Business Administration is to prepare its graduates for positions in the management of complex organizations in both business and government. The degree programs are designed to prepare students both for *entrance* into business and government and for *advancement* to high-level management positions.

Programs in the School include examination of administrative principles and quantitative approaches to decision-making common to both business and government. These programs stress the points at which major policy decisions of either business or government must give consideration to related policy decisions of the other. Emphasis is placed on the fact that management education is not limited to organizational techniques but is, in the broadest sense, education for management responsibility.

It is the policy of the School to emphasize a broad fundamental education as the best preparation for positions carrying management or administrative responsibility.

The degree of Master of Science in Administration develops the elements common to all management positions regardless of the nature of the operation. This degree program is based on the study of the principles of management, human relations, and problem-solving plus an area of specialization.

In order to provide students with a common body of knowledge of business or governmental administration, programs include the equivalent of at least one year of work comprising the following areas:

1. In the case of business enterprise, a background of the concepts, processes, and institutions in marketing and distribution, production, and financing functions; in the case of governmental administration, a background of concepts, processes, and institutions of planning, programming, budgeting, personnel practices, and policy formulation in government.

2. A background of the economic and legal environment of business and government enterprise, along with consideration of the social and political influences on business.

3. A basic understanding of the concepts and methods of accounting or budgeting, quantitative methods, and information systems.

4. A study of organization theory, interpersonal relationships, control and motivation systems, and communications.

5. A study of administrative processes under conditions of uncertainty, including the integration of analysis and policy determination at the over-all management level.

ADMISSION

For detailed information see "Admission as a Degree Candidate," page 17, and "Master's Degree Candidacy," pages 19–21.

REQUIREMENTS FOR THE DEGREE

RESIDENCE

A minimum of 30 semester hours of graduate work must be completed while registered as a degree candidate in this off-campus program.

The thesis and thesis seminar (6 semester hours) may be included in the 30 hours of course work taken in residence. A graduate student who transfers from another division of the University is required to have a minimum of 12 hours of course work as a degree candidate in this off-campus program.

SCHOLARSHIP

An average of *B* or better is required for the Master's degree. The grade of *C* is not considered as failing but must be counter-balanced by a grade of *A* in a graduate course of equal status. A student whose scholarship is unsatisfactory may be suspended.

THESIS

With the approval of the adviser, a thesis may be substituted for 6 semester hours of course work.

The thesis subject and the thesis in its final form must be approved by the director of the thesis and the faculty adviser and presented to the dean no later than the date announced in the calendar. Printed copies of detailed regulations regarding the form and reproduction of the thesis are available at the Office of Counseling and Student Records, College of General Studies.

Payment of tuition for the thesis entitles the candidate, during the two semesters he registers for thesis (299–300), to the advice and direction of the member of the faculty under whom the thesis is to be written. In case a thesis is unfinished, an additional successive academic year is granted without further tuition payment. The student must, however, maintain continuous registration during this period. If the preparation of the thesis extends more than three semesters beyond the date the student registers for thesis 300, he must register for the entire 6 hours of thesis again and pay tuition as for a repeated course.

COURSE SUBSTITUTION

It is the responsibility of the student to get written approval from the faculty adviser prior to registration for any course substitution. Forms for requesting substitution are available at the Office of Counseling and Student Records, College of General Studies.

MASTER'S COMPREHENSIVE EXAMINATION

The Master's candidate is required to pass a written Master's Comprehensive Examination. Before applying for the examination, the student must have completed all of the courses in his program, and he must have maintained a 3.00 *(B)* average. In writing the examination, the student is expected to correlate what he has learned in his course work and his reading in the literature of the field. The examinations are conducted at the University in December for students graduating in February, in April for students graduating in June, and in July for students graduating in September.

A candidate who fails the examination may, in exceptional circumstances and with specific approval of his advisers, repeat the examination, but only after the lapse of one semester and the undertaking of additional preparation as prescribed. *If he fails a second time, no further opportunity to take the examination will be permitted.*

REQUIRED COURSES

		Semester Hours
B Ad 202:	Relations of Government to Business	3
*Econ 220:	Survey of Principles and Issues in Economics	3
Mgt 201:	Advanced Administrative Management	3
†Mgt 204:	Quantitative Factors in Administration	3
Mgt 207:	Human Behavior in Organizations	3
Mgt 218:	Survey of Data Processing	3
		18
Area of Concentration:		12–18
Elective:	To be selected with the approval of the adviser	0–6
	Total	36

Areas of Concentration

I. AUTOMATIC DATA PROCESSING

Faculty Adviser: John F. McCarthy, Jr., Associate Professor of Business Administration; Government 409, Telephone: 676–7089.

This area of concentration provides a broad understanding of the principles of manual, mechanical, and electronic data processing, including computer pro-

* Not required in Business Management area of concentration
† Mgt 204 is waived for students electing Business Financial Management, Management Science—Operations Research, or Systems Management as an area of concentration

gramming concepts, methods, and languages; an appreciation of the capabilities and the limitations of data processing equipment; a knowledge of the phases of management information systems development; and an understanding of management's role in data processing. It provides an appreciation of the role of data processing as a tool of management.

		Semester Hours
Mgt 219:	Digital Computer Programming Concepts	3
Mgt 220:	Comparative Digital Computer Systems and Their Management	3
Mgt 221:	Management Information Systems Development and Application	3
Mgt 223:	Management of a Data Processing Organization	3
	Total	12

BUSINESS FINANCIAL MANAGEMENT*

Faculty Adviser: Rodney Eldridge, Associate Professor of International Finance; Government 405, Telephone: 676-6892.

This area of concentration provides a background in business budgeting, controllership, treasury, long-range planning, reporting, and financial management processes. Courses are designed to emphasize the planning, analysis, implementation, and controls necessary for making effective financial decisions.

		Semester Hours
Acct 215:	Survey of Managerial Accounting	3
B Ad 231:	Financial Decision-making	3
B Ad 232:	Capital Resource Management	3
B Ad 233:	International Business Finance	3
B Ad 237:	Investment Analysis	3
†Mgt 225:	Introduction to Managerial Statistics	3
	Total	18

BUSINESS MANAGEMENT

Faculty Adviser: George Frederick Conner, Associate Professor of Business Administration, Government 401, Telephone: 676-7097.

This area of concentration, with its prerequisites, provides the essentials of business administration with emphasis upon managing the finance, production, marketing, and accounting functions of a business firm. These functions are integrated in a final course using actual business cases.

PREREQUISITE:

Eight semester hours in Mathematics, 6 semester hours in Economics (not including Econ 220), and 3 semester hours each in Accounting, Business Administration, and Statistics.

* Mgt 204 *Quantitative Factors in Administration* is waived in this area of concentration.
† Mgt 203 *Mathematics for Management* or the equivalent in prerequisite for this course

		Semester Hours
Acct 215:	Survey of Managerial Accounting	3
B Ad 225:	Seminar: Manufacturing Production	3
B Ad 231:	Financial Decision-making	3
B Ad 241:	Advanced Marketing Management	3
B Ad 297:	Case Studies in Business Administration	3
	Total	15

IV. GOVERNMENTAL ADMINISTRATION

Faculty Adviser: Daniel R. Cloutier, Professor of Public Administration; Government 302, Telephone: 676-6295.

This area of concentration emphasizes policy formulation and administration in government. It provides the broad dimensions of public administration for those preparing for managerial responsibility in the public service.

		Semester Hours
P Ad 213:	Administration in Government	3
P Ad 231:	Public Personnel Administration	3
P Ad 251:	Governmental Budgeting	3
P Ad 252:	Problems in Planning, Programming, and Budgeting	3
P Ad 260:	Seminar: Policy Formulation and Administration	3
	Total	15

V. INDUSTRIAL PERSONNEL MANAGEMENT

Faculty Adviser: Joe L. Jessup, Professor of Business Administration; Government 400, Telephone: 676-6068.

This area of concentration provides a basic academic and professional foundation, equipping the student for administrative responsibility in industrial personnel management. The courses cover the fields of personnel management, industrial relations, unionism, collective bargaining, labor relations, and manpower development and utilization.

		Semester Hours
B Ad 208:	Personnel Management and Industrial Relations	3
B Ad 209:	Seminar: Personnel Management	3
B Ad 212:	Unionism and Collective Bargaining	3
B Ad 213:	Current Issues in Unionism, Collective Bargaining, and Labor Relations	3
P Ad 233:	Seminar: Manpower Development and Utilization	3
	Total	15

VI. INTERNATIONAL COMMERCE

Faculty Adviser: Geza P. Lauter, Associate Professor of Business Administration; Government 404, Telephone: 676-7374.

This area of concentration prepares students for careers in firms operating on a

ultinational basis or about to enter the international field; for careers in the ederal government and in international agencies concerned with business, industry, and finance abroad; and for the commerce option of the Foreign Service Officer Examination.

		Semester Hours
B Ad 233:	International Business Finance	3
B Ad 248:	International Marketing	3
B Ad 255:	International Trade	3
B Ad 256:	Seminar: International Trade	3
B Ad 257:	Operation of the Multinational Firm	3
	Total	15

II. MANAGEMENT ENGINEERING

aculty *Adviser:* Jack W. Waldrip, Assistant Professor of Management; Building Y, oom 21, 2131 G Street, N.W.; Telephone 676-7139.

his area of concentration provides a background for industrial management. ourses cover organization and functioning of industrial firms, and the management practice and problems of such firms.

		Semester Hours
B Ad 225:	Seminar: Manufacturing Production	3
B Ad 280:	Procurement and Contracting	3
B Ad 297:	Case Studies in Business Administration	3
Mgt 224:	Theory and Management of Systems	3
Mgt 230:	Administration of Research and Development	3
	Total	15

III. MANAGEMENT SCIENCE–OPERATIONS RESEARCH*

aculty *Adviser:* Robert L. Holland, Associate Professor of Management Science; overnment 201, Telephone: 676-7375.

his area of concentration develops a thorough understanding of quantitative mathematical approaches to problems of managerial control and decision-aking. While the program will develop a competent background in basic athematical theory associated with the various techniques, it is oriented towards applications of the techniques rather than their theoretical mathematical ontent.

		Semester Hours
†Mgt 225:	Introduction to Managerial Statistics	3
Mgt 226:	Managerial Statistics	3
Mgt 227:	Mathematical Programming: Techniques and Applications	3
Mgt 229:	Seminar: Management Science and Operations Research	3

Mgt 204 *Quantitative Factors in Administration* is waived in this area of concentration.
Mgt 203 *Mathematics for Management* or the equivalent is prerequisite for this course

		Semester Hours
*Other courses:	To be selected from the following as approved by the adviser	9
B Ad 261:	Managerial Economics I	
B Ad 262:	Managerial Economics II	
Econ 217–18:	Survey of Economics	
Mgt 219:	Digital Computer Programming Concepts	
Mgt 220:	Comparative Digital Computer Systems and Their Management	
Mgt 224:	Theory and Management of Systems	
Mgt 228:	Systems Analysis by Simulation	
	Total	21

IX. MANAGERIAL ACCOUNTING

Faculty Adviser: Anthony J. Mastro, Associate Professor Accounting; Government 302, Telephone: 676-6055.

This area of concentration provides a knowledge of interrelated systems of accounting in planning and control for management. Emphasis is on the requirements of management for accounting information with concern for general and corporate accounting principles to the extent related to the managerial accounting functions.

PREREQUISITE

Acct 115 *Survey of Financial Accounting* or the equivalent is required as a prerequisite to this program.

		Semester Hours
†Acct 215:	Survey of Managerial Accounting	3
Acct 262:	Business Income Taxation	3
Acct 276:	Management Planning and Control	3
Acct 295:	Seminar in Accounting	3
Mgt 219:	Digital Computer Programming Concepts	3
	Total	15

X. PROCUREMENT AND CONTRACTING

Faculty Adviser: Stanley N. Sherman, Assistant Professor of Business Administration; Government 312, Telephone: 676-7462.

This area of concentration provides a basic academic and professional foundation, equipping the student for administrative responsibility in procurement and contracting. The courses cover industrial purchasing, procurement activities of the federal government, and contracting activities of vendors to the federal government.

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* Econ 217-18 is prerequisite to B Ad 261 and 262. Students who receive credit for Econ 220 (see the "Required Courses," see page 56, cannot receive credit for Econ 217-18. Students who elect B Ad 261 and 262 will be permitted to substitute Econ 217 for Econ 220 and they should elect Econ 218 as an elective.

† If Acct 215 or an equivalent course has been taken prior to entrance into this program, students may substitute Acct 275 or 282.

		Semester Hours
B Ad 279:	Purchasing and Materials Management	3
B Ad 280:	Procurement and Contracting	3
B Ad 282:	Government Contract Administration	3
B Ad 283:	Pricing and Negotiation	3
B Ad 285:	Systems Procurement and Project Management	3
	Total	15

XI. PUBLIC FINANCIAL MANAGEMENT AND BUDGETING

Faculty Adviser: Stephen R. Chitwood, Assistant Professor of Public Administration; Government 310, Telephone: 676-6064.

This area of concentration provides a broad foundation for work in governmental planning, programming, budgeting; and for controllership and related financial management activities. Its main stress is on financial processes and decision-making in the public service.

		Semester Hours
Acct 215:	Survey of Managerial Accounting	3
P Ad 213:	Administration in Government	3
P Ad 251:	Governmental Budgeting	3
P Ad 252:	Problems in Planning, Programming, and Budgeting	3
	Total	12

XII. PUBLIC PERSONNEL MANAGEMENT

Faculty Adviser: Waldo Sommers, Professor of Public Administration; Government 1A, Telephone: 676-6792.

This area of concentration provides a basic academic and professional foundation, equipping the student for administrative responsibility in public personnel management. The courses cover the federal administrative organization and process; principles, functions, and problems of personnel administration in the public service; unionism and collective bargaining; and manpower development and utilization.

		Semester Hours
B Ad 212:	Unionism and Collective Bargaining	3
P Ad 213:	Administration in Government	3
P Ad 231:	Public Personnel Administration	3
P Ad 232:	Problems in Public Personnel Management	3
P Ad 233:	Seminar: Manpower Development and Utilization	3
	Total	15

XIII. RESEARCH AND DEVELOPMENT MANAGEMENT

Faculty Adviser: Daniel D. Roman, Professor of Management Science; Government 300, Telephone: 676-6298.

This area of concentration provides a basic academic and professional foundation, equipping the student for responsibility in research and development management. The courses cover technological change and manpower, public policy

toward science and technology, government contract administration, and the administration of research and development.

		Semester Hours
B Ad 282:	Government Contract Administration	3
Mgt 230:	Administration of Research and Development	3
P Ad 235:	Technological Change and Manpower	3
P Ad 262:	Seminar: Science, Technology, and Public Policy	3
Other courses:	To be selected from the following as approved by the adviser	6
B Ad 225:	Seminar: Manufacturing Production	
B Ad 285:	Systems Procurement and Project Management	
Mgt 203:	Mathematics for Management	
Mgt 225:	Introduction to Managerial Statistics	
Mgt 226:	Managerial Statistics	
	Total	18

XIV. SYSTEMS MANAGEMENT*

Faculty Adviser: Marvin M. Wofsey, Professor of Management; Building D, Room 403, 2129 G Street, N.W.; Telephone: 676-7183.

This area of concentration provides a basic academic and professional foundation, equipping the student for administrative responsibility in computer-based systems. The courses cover computers, data processing, operations research, and the theory and management of systems.

		Semester Hours
Mgt 203:	Mathematics for Management	3
Mgt 220:	Comparative Digital Computer Systems and Their Management	3
Mgt 223:	Management of a Data Processing Organization	3
Mgt 224:	Theory and Management of Systems	3
Mgt 225:	Introduction to Managerial Statistics	3
	Total	15

ELECTIVES

Unless a student elects to write a thesis, he may select electives appropriate to his program from graduate courses offered by the School of Government and Business Administration. To choose electives from other related departmental offerings in this University, the student must obtain the written approval of the faculty adviser. A form for this purpose may be obtained from the Office of Counseling and Student Records, College of General Studies.

MASTER OF SCIENCE†

The School of Engineering and Applied Science in cooperation with the National Aeronautics and Space Administration's Langley Research Center, Hamp-

* Mgt 204 *Quantitative Factors in Administration* is waived in this area of concentration.
† For course descriptions, see the *School of Engineering and Applied Science* catalogue

ton, Virginia, has a graduate engineering program at NASA-Langley. NASA-Langley's extensive scientific and engineering facilities and equipment are available to students in this program.

The programs at NASA-Langley lead to the degree of Master of Science in the fields of Acoustics, Aerospace Engineering (including options in Aeronautics and Astronautics), Computer Science, and other fields in electrical and mechanical engineering. These programs are open to qualified NASA employees and area residents. With the approval of the instructor, courses may be taken in nondegree status.

The School of Engineering and Applied Science in cooperation with the Naval Ship Research and Development Laboratory, Annapolis, Maryland, has a graduate engineering program leading to the degree of Master of Science in fields of electrical engineering and in Ocean Engineering. The programs are open to qualified NSRDL employees and area residents. Classroom facilities at the U.S. Naval Academy are available for this program.

The School of Engineering and Applied Science has academic jurisdiction over these degree programs which are administered by the College of General Studies.

ADMISSION

For detailed information see "Admission as a Degree Candidate," page 17, and "Master's Degree Candidacy," pages 19–21.

REQUIREMENTS FOR THE DEGREE

The minimum program consists of 24 semester hours of approved graduate courses and a Master's thesis (equivalent to 6 semester hours). With the approval of the Department, the student may elect an optional program without a thesis which consists of a minimum of 33 semester hours of approved graduate courses. All Master's candidates are required to pass a Master's Comprehensive Examination. Students whose undergraduate study does not include necessary prerequisites may be required to take more than the minimum semester hours required.

Upon admission the student is assigned an adviser. Programs of study are determined by any prerequisites established and the requirements of the department in which the student wishes to study. The program of studies in preparation for the Master's Comprehensive Examination must be approved by the student's adviser and the appropriate department chairman.

SCHOLARSHIP

For Master's work, a minimum of 24 semester hours (for those who receive credit for a thesis) or 33 semester hours (for those who do not receive credit for a thesis) of graduate course work with the grade of *B* or higher is required for graduation. Students who receive two grades of *F*, or three grades below *B*, are barred from further enrollment in graduate courses and, ordinarily, will not be readmitted to graduate study. Students who receive the grade of *C* in one or two courses are required to take additional course work to make up the minimum semester hours of work with grades of *B*.

RESIDENCE

In general, a minimum of one year of full-time study, or the equivalent in part-time study, must be completed in the School of Engineering and Applied Science.

MASTER'S THESIS

The degree candidate must submit an acceptable thesis to demonstrate his ability to make independent use of the knowledge and discipline of thought acquired and developed by graduate study, to furnish objective evidence of constructive power in a given field, and to demonstrate that he can communicate the results of his work in writing. Work of a suitable character for which the student has professional responsibility may be considered, whether done on or off campus, provided no significant amount of work is completed without faculty supervision.

As a part of registration for the thesis course 299, the candidate must submit to the appropriate department chairman (on the form obtainable at the School office) his thesis area, approved by his faculty adviser. He must submit his thesis title to the Dean, on the form available in the School office, at the beginning of the semester in which he expects to graduate. Registration in thesis 299-300 entitles the student, during such registration, to the advice of the member of the faculty under whom the thesis is to be written. He may consult his adviser, but the thesis is the exclusive responsibility of the student.

The thesis in final form must be submitted to the appropriate department chairman by the date stated in the calendar for the semester in which the candidate enrolls in thesis 300. In case a thesis is unfinished on the date specified, the student will be granted an additional semester and must pay the "Continuous Registration" fee (see page 23) unless he is registered for course work. If the preparation of the thesis extends beyond the three semesters, approval for an extension of time will be required and the student must reregister for thesis 300 and pay tuition as for a repeated course.

A thesis may be submitted in final form one time. The acceptability of the thesis is determined exclusively by the Master's Comprehensive Examination committee. If the thesis is unacceptable, the student's graduate status is terminated.

Printed copies of detailed regulations regarding the form and reproduction of the thesis are available in the Office of the School. Accepted theses, with accompanying drawings, become the property of the University and are deposited in the University Library and the School's Library, where the duplicate copies are bound and made available for circulation. Permission to publish or adapt material in them must be secured from the Dean.

MASTER'S THESIS OPTION

With the approval of the Department, the student may elect an optional program without a thesis which consists of a minimum of 33 semester hours of approved graduate courses.

MASTER'S COMPREHENSIVE EXAMINATION

After completing his prescribed program, the candidate must pass a Master's Comprehensive Examination, to demonstrate substantial understanding of principles and method and their use in the area of his interest. This Examination may be written, oral, or both. A graduate student who fails any portion of the Master's Comprehensive Examination on his first attempt may be examined one more time if approval is given by the appropriate Examining Committee. In the event of failure to complete the Examination satisfactorily, the student's graduate status terminates.

TIME TO COMPLETE MASTER'S DEGREE REQUIREMENTS

A full-time Master's candidate is allowed a maximum of three calendar years to complete all degree requirements, from the date of his first graduate-student status registration in prerequisite or graduate courses. A part-time Master's candidate is allowed a maximum of five calendar years. The time limit does not include any period of registration as an unclassified student before admission to graduate student status, nor does it encompass any specified period spent on approved leave of absence. Readmission is required upon expiration of leave of absence under the conditions and requirements then prevailing.

Students who do not complete degree requirements within the allowed time have their graduate status terminated. They may be readmitted to graduate status under conditions specified by the department chairman and approved by the Dean.

MASTER OF ENGINEERING ADMINISTRATION

The School of Engineering and Applied Science in cooperation with the Naval Ship Research and Development Laboratory, Annapolis, Maryland, has a graduate engineering program leading to the degree of Master of Engineering Administration. The program is open to qualified NSRDL employees and area residents. Classroom facilities at the U.S. Naval Academy are available for this program.

The School of Engineering and Applied Science has academic jurisdiction over this degree program which is administered by the College of General Studies.

ADMISSION

For detailed information see "Admission as a Degree Candidate," page 17, and "Master's Degree Candidacy," pages 19–21

REQUIREMENTS FOR THE DEGREE

The requirements for the degree of Master of Engineering Administration are the same as those listed under the degree of Master of Science (see pages 63–65).

SPECIAL DEGREE PROGRAMS

In cooperation with the Industrial College of the Armed Forces, Fort McNair, Washington, D.C., a program of study is offered leading to the degree of Master of Science in Administration. The School of Government and Business Administration has academic jurisdiction over this program which is open only to current students and faculty of the Industrial College of the Armed Forces. For further information, contact Harry R. Page, Faculty Adviser for the Industrial College of the Armed Forces program, Telephone 676-6115.

In cooperation with the National War College, Fort McNair, Washington, D.C., and the Naval War College, Newport, R.I., the School of Public and International Affairs offers a special program of study leading to the degree of Master of Science in International Affairs. This program is open only to students and faculty of the National and Naval War Colleges. For further information, contact Carter Burns, Director of the National War College program, Telephone: 676-7049, or Burton M. Sapin, Faculty Adviser for the National War College program, Telephone 676-6240, or Hiram M. Stout, Director of the Naval War College program, Newport, R.I.

In cooperation with the Naval Dental School, National Naval Medical Center, Bethesda, Md., a new program of study is offered leading to the degree of Master of Science in Special Studies (Oral Biology). The Graduate School of Arts and Sciences has academic jurisdiction over this program which is open to dental officers serving on active duty with the U.S. Armed Forces or with other federal agencies. For further information contact William F.E. Long, Associate Dean of the Graduate School of Arts and Sciences, Telephone 676-6210, or Edward B. Wright, College of General Studies, Telephone 676-7024.

SPECIAL PROGRAMS OF THE COLLEGE OF GENERAL STUDIES

CONFERENCES, SEMINARS, AND INSTITUTES

THE COLLEGE OF GENERAL STUDIES presents a variety of conferences, seminars, and institutes designed to meet the needs of business, industry, and professional groups. For further information, contact Mrs. Ruth H. Osborn, Director of Special Programs, College of General Studies, Telephone 676-7036.



Earl J. Ross (l.), Assistant to the Dean for Special Programs, meets with Patrick A. Barbati (r), Budget Officer, and Mrs. Billie Jo Moreland, Administrative Assistant to the Dean.

SPECIAL CREDIT PROGRAMS

To encourage participation in foreign-tour programs and continuing education throughout life, courses designed to meet specific needs of interested individuals, groups, and agencies are offered in the liberal arts, education, and other areas.

For further information contact Mrs. Ruth H. Osborn, Director of Continuing Education for Women, College of General Studies, Telephone 676-7036; or John A. Morrow, Director of Off-campus Programs for Teachers, College of General Studies, Telephone 676-7015.

CONTINUING EDUCATION FOR WOMEN

Many women wish to resume their education on a part-time basis when homemaking responsibilities permit. They feel the need to return to the classroom to update their education, prepare for new careers, participate more effectively in community affairs, or enrich their own lives through a sense of personal growth. The Continuing Education for Women program has been developed to meet these needs.

To help women focus their interests and achieve their goals, Continuing Education for Women offers (1) a group guidance course, *Developing New Horizons for Women*, (2) off-campus credit courses at hours and locations convenient for women, (3) selected noncredit courses, (4) academic counseling for women entering degree and nondegree programs in the College of General Studies, and (5) referral to other colleges within the University.

For further information, contact Mrs. Ruth H. Osborn, Director of Continuing Education for Women, or Mrs. Abbie O. Smith, Assistant Director of Continuing Education for Women, College of General Studies, Telephone 676-7036.

DEVELOPING NEW HORIZONS FOR WOMEN

Developing New Horizons for Women is offered each semester to help women develop their potential through understanding themselves as individuals and as women; to gain confidence in their abilities; and to become acquainted with educational, occupational, and community service opportunities. There are no prerequisites for this course. Most of the women who enroll are homemakers with school-age children. They range in age from 19 to 64. Although some have no previous college education, approximately one-half have Bachelor's degrees, and others have earned graduate degrees. More than 2,000 women have completed this program since it was originated at George Washington University in 1964.

Developing New Horizons for Women, a 15-week noncredit course, includes lectures, group discussions, guest speakers, psychological testing, and individual counseling. Participants attend class one day a week from 10 a.m. to 12:30 p.m. One section meets on campus and other sections meet in nearby Maryland and Virginia. During the final five weeks all sections meet on campus to hear guest speakers.

After completing this course, approximately one-half of the women enroll in some type of educational program at George Washington University or at other colleges and universities. Others obtain jobs or find opportunities for significant volunteer service. Some combine part-time study with part-time employment.

OFF-CAMPUS CREDIT COURSES

To enable women with home responsibilities to continue their formal education, the College of General Studies offers credit courses off campus. These courses, which may be taken for undergraduate or graduate credit, meet at hours and locations convenient for homemakers. Classroom space has been provided by churches and community centers in Alexandria, Annandale, Arlington, Falls Church, McLean, Reston, and Springfield in Virginia; Bethesda, Chevy Chase, Kensington, Rockville, and Takoma Park in Maryland; and in the District of Columbia.

Each credit course meets once a week for two and one-half hours during the day when children are in school. Although many women take these courses to meet requirements for degree programs, they can also be accepted in a nondegree status. Many who successfully complete off-campus credit courses as nondegree students are encouraged to apply for degree candidacy at George Washington University. Other women need only specific courses to qualify for positions in business or government; some who already hold academic degrees wish to qualify for professional certification in such fields as teaching or guidance. Many students in this program have had credits transferred to other colleges and universities throughout the country.

In some cases government and industry have granted leave for employed women to enroll in the daytime credit courses, particularly where the courses are job-related.

NONCREDIT COURSES

Selected noncredit courses which supplement the academic programs of the University are offered through Continuing Education for Women. Courses offered during 1970–1971 included: *Introduction to Creative Thinking, Introduction to Library Science, Introduction to Occupational Therapy, Introduction to Social Work, Oral History Workshop, Mathematics Refresher,* and *How to Study.*

Each course met for two hours once a week for ten weeks. Additional courses to meet the needs of adult women are planned for 1971–1972.

ACADEMIC COUNSELING

The professional staff of Continuing Education for Women counsels women interested in enrolling in degree and nondegree programs in the College of General Studies. Counselors are available at dates and locations indicated for registration. Appointments can also be made for individual or group counseling at the Office of Continuing Education for Women, 2029 K Street, N.W.

The Continuing Education for Women program was originated for women; however, men are welcome to enroll in the daytime credit and noncredit courses.

For further information about the programs of Continuing Education for Women, telephone 676-7036, or write to Continuing Education for Women, College of General Studies, 2029 K Street, N.W., Washington, D.C. 20006. Descriptive brochures and semester course schedules are available.

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Robert W. Stewart, Associate Director for the Federal After-hours Program, checks classroom locations in the downtown D.C. area.

OFF-CAMPUS LOCATIONS OF THE COLLEGE OF GENERAL STUDIES

DISTRICT OF COLUMBIA

Bolling Air Force Base, Washington, D.C. 20332

Education Director: Edward Corbin
Office: Room 205, Building P-20
Telephone: 574-5348
Representative for the University: I. Ralph DeBelles
Telephone: 676-7061
Open to military and civilian personnel of the Air Force and to others by permission

Federal After-hours Program

Representative for the University: Robert W. Stewart, Jr.
Telephone: 676-7018
Open to employees of federal agencies, military, and industry, and to others by permission
The following agencies participate in the Federal After-hours Program:

BUREAU OF CUSTOMS, WASHINGTON, D.C. 20226

Director: James J. Doherty, Training and Career Development
Office: 2100 K Street, N.W.
Telephone: 964-8000

BUREAU OF DOMESTIC AND INTERNATIONAL BUSINESS, WASHINGTON, D.C. 20230

Education Directors: David Sullivan, Chief, Employee Development Branch; Mike Patchan, Jr., Employee Development Officer
Office: Room 1521, Commerce Department Building, 14th Street and Constitution Avenue, N.W.
Telephone: 967-7075 or 967-7076

BUREAU OF NARCOTICS AND DANGEROUS DRUGS, WASHINGTON, D.C. 20573

Education Director: N.E. Bentson, Personnel Officer
Office: Room 605, 1405 Eye Street, N.W.
Telephone: 382-4231

CIVIL SERVICE COMMISSION, WASHINGTON, D.C. 20415

Education Director: John W. Murtha, Director of Personnel
For information contact Employee Development Officer, Personnel Division
Office: Room 1679, 1900 E Street, N.W.
Telephone: 632-5400

COAST GUARD, WASHINGTON, D.C. 20591

Chief, Training Section, Headquarters Civilian Personnel Branch: W.I. Barry
Office: Room 8114A, Nassif Building, 400 7th Street, S.W.
Telephone: 426-2342

DEPARTMENT OF JUSTICE, WASHINGTON, D.C. 20530

Education Director: Daniel Keenan, Chief, Career Development Section
Office: Room 1229, 10th Street and Pennsylvania Avenue, N.W.
Telephone: 739-3911

DEPARTMENT OF LABOR, WASHINGTON, D.C. 20210

Chief, Training and Development Group: Joseph Maas
For information contact Mrs. Carole Johnson
Office: Room 6141, 14th Street and Constitution Avenue, N.W.
Telephone: 961-2101

DEPARTMENT OF STATE, WASHINGTON, D.C. 20520

Liaison Officer: Mrs. Barbara Morlet, Training Specialist, Extension Studies Program
Office: Foreign Service Institute, State Annex 3
Telephone: 557-5517 or 557-5518

DEPARTMENT OF THE TREASURY, WASHINGTON, D.C. 20226

BUREAU OF ACCOUNTS

Education Director: Miss Kathie Libby, Employee Development Specialist
Office: Room 112, Treasury Annex Number 1, Pennsylvania Avenue and Madison Place, N.W.
Telephone: 964-5565

DISTRICT OF COLUMBIA GOVERNMENT, WASHINGTON, D.C. 20001

Education Directors: Benjamin J. Ludwig, Chief of Training; C. Howard Larson, Employee Development Officer
Office: Room 211, 499 Pennsylvania Avenue, N.W.
Telephone: 629-2270 or 629-2997

FEDERAL AVIATION ADMINISTRATION, WASHINGTON, D.C. 20590

Education Director: Mrs. Phyllis Burbank, Employee Development Specialist
Office: Room 509, 800 Independence Avenue, S.W.
Telephone: 426-3320

FEDERAL COMMUNICATIONS COMMISSION, WASHINGTON, D.C. 20554

Education Director: Charles A. Orsi
Office: Room 208, 1919 M Street, N.W.
Telephone: 632-7120

FEDERAL RESERVE SYSTEM, WASHINGTON, D.C. 20551

Education Coordinator: Miss Sudelle Rice, Personnel Technician
Office: 20th Street and Constitution Avenue, N.W.
Telephone: 737-1100, Extension 404

INTERNAL REVENUE SERVICE, WASHINGTON, D.C. 20224

Education Director: D.C. Barry, Chief, National Office Training Branch
Office: Room 1311, 12th Street and Constitution Avenue, N.W.
Telephone: 946-6101

INTERSTATE COMMERCE COMMISSION, WASHINGTON, D.C. 20423

Education Director: Samuel D. Bingman, Jr., Training Officer
Office: Room 1420, 1200 Constitution Avenue, N.W.
Telephone: 737-9765, Extension 7116

NATIONAL SCIENCE FOUNDATION, WASHINGTON, D.C. 20550

Training Officer: Herbert L. Morris
Office: 1800 G Street, N.W.
Telephone: 632-4107

POST OFFICE DEPARTMENT, WASHINGTON, D.C. 20260

Education Directors: Francis J. Mahaney; J.A. Matukonis, Training Division, Bureau of Personnel
Office: Room 205, 6900 Wisconsin Avenue, Chevy Chase, Md.
Telephone: 656-9125

VETERANS ADMINISTRATION, WASHINGTON, D.C. 20420

Education Directors: Raymond L. Butler, Chief, Employee Relations and Training Division; Philip L. Loomis, Assistant Chief, Employee Relations and Training Division
Office: Room 100, Veterans Administration Main Building, Vermont Avenue and H Street, N.W.
Telephone: 389-3101

Forrestal Building, L'Enfant Plaza, Washington, D.C. 20314

Education Director and Chairman of the Department of Defense Education and Training Advisory Council: Philip F. Strauss
Office: Room 3C147, The Pentagon
Telephone: 697-8015 or 697-2823
Program Coordinator: George Merritt
Office: Room BE079, Forrestal Building
Telephone: 693-8484 or 693-8485

Representative for the University: Robert Raful
Telephone: 676-7028
Open to active duty military personnel and Department of Defense civilians, and to retired military personnel and other federal employees on a space-available basis

Fort McNair, Washington, D.C. 20315

Educational Adviser: Miss Margaret Lockwood
Office: Building 20A, Second Floor, Post Education Center
Telephone: 527-9400, Extension 268
Representative for the University: I. Ralph DeBelles
Telephone: 676-7061
Open to military and civilian personnel of the Army and to other government employees by permission

Industrial College of the Armed Forces, Fort McNair, Washington, D.C. 20315

Project Officer: Lt. Col. Helen J. Blakeman, USAF
Office: Room 324, Industrial College of the Armed Forces
Telephone: 693-8413
Director for the University: Harry R. Page
Office: Room 302, Hall of Government, 710 21st Street, N.W.
Telephone: 676-6115
Representative for the University: I. Ralph Debelles
Telephone: 676-7061
Open to students and faculty of the Industrial College of the Armed Forces

Washington Navy Yard, Washington, D.C. 20390

Education Director: Miss Clara Williams, Employee Development Officer
Office: Room 202, Building 172, M at 9th Streets, S.W.
Telephone: 693-3188 or 693-3160
Representative for the University: Robert Raful
Telephone: 676-7028
Open to active and retired military personnel and all federal employees

MARYLAND

Aberdeen/Edgewood, Md.

Education Director: John L. Lichy, Chief, Educational Services Division
Office: Building 3146, Army Education Center, Aberdeen Proving Ground, Md. 21005
Telephone: (301) 278-3385
Education Director: R. G. Mehr
Office: Army Education Center, Building 4475, Edgewood Arsenal, Md. 21010
Telephone: (301) 671-2166
Representative for the University: Michael G. O'Connor
Telephone: (202) 676-7023
Open to military and civilian personnel attached to the Aberdeen Proving Ground and Edgewood Arsenal and to others by permission

Andrews Air Force Base, Washington, D.C. 20331

Education Director: John Duffy
Office: Room 4, Building 3484
Telephone: 981-6377
Representative for the University: Robert Engle
Telephone: 676-7025
Open to military and civilian personnel of the Air Force and to others by permission

Army Topographic Command, Corps of Engineers, Washington, D.C. 20315

Education Directors: Arthur Benton, Chief, Training and Development Division; John Rea, Development Specialist; Mrs. Connie Clem, Personnel Specialist
Office: Erskine Hall, 6500 Brooks Lane, N.W.
Telephone: 986-2384 or 986-2385
Representative for the University: Edward B. Wright
Telephone: 676-7024
Open to employees of the U.S. Army Topographic Command and others by permission, obtained at least one week prior to the first week of classes, from the Training and Development Division, Telephone 986-2384.

Edgewood Arsenal, Md. 21010 (see Aberdeen/Edgewood)

Environmental Science Services Administration (see National Oceanic and Atmospheric Administration)

Federal Office Building, Baltimore, Md. 21201

Office: Charles Center, 31 Hopkins Plaza
Telephone: (301) 962-4980
Representative for the University: Frank Dulong
Telephone: (202) 676-7029
Open to everyone

Fort George G. Meade, Md. 20755

Office: Building 303, Army Education Center
Telephone: (301) 677-6421
Representative for the University: Michael G. O'Connor
Telephone: (202) 676-7023
Open to military and civilian personnel of the Army and to other government employees by permission

Frederick Community College, Frederick, Md. 21701

Education Director: Patrick L. Christoff, Assistant Dean of Community Services
Office: Opossumtown Pike
Telephone: (301) 662-0101
Representative for the University: Frank Dulong
Telephone: (202) 676-7029
Open to everyone

Hagerstown Junior College, Hagerstown, Md. 21740

Education Director: Frederick F. Otto, Dean of Community Services
Office: 751 Robinwood Drive
Telephone: (301) 731-2800, Extension 36
Representative for the University: Frank Dulong
Telephone: (202) 676-7029
Open to everyone

Montgomery College, Rockville, Md. 20850

Education Director: Nathan C. Shaw, Director of New Programs and Community Services
Office: 51 Mannakee Street
Telephone: 762-7400
Representative for the University: Frank Dulong
Telephone: 676-7029
Open to everyone

National Naval Medical Center, Bethesda, Md. 20014

Education Director: J. Szabados, Head, Training and Educational Services
Telephone: 295-0574
Representative for the University: Edward B. Wright
Telephone: 676-7024
Open to military and civilian personnel of the Navy, employees of the National Institutes of Health, and to others as space permits

National Oceanic and Atmospheric Administration (formerly Environmental Science Services Administration) **Rockville, Md. 20852**

Education Directors: Paul F. Murphy, Employee Development Officer; Mrs. Muriel Christgau, Employee Development Specialist, Personnel Division
Office: Room 323, North Bethesda Office Center, 11820 Rockville Pike
Telephone: 496-8261
Representative for the University: Edward B. Wright
Telephone: 676-7024
Open to all employees of the Department of Commerce and to others by permission

Naval Academy, Annapolis, Md. 21402

Coordinator for the University Programs: William W. Jeffries, Archivist, U.S. Naval Academy
Office: Maury Hall
Telephone: (301) 268-7711, Extension 642
Representative for the University: Michael G. O'Connor
Telephone: (202) 676-7023
Open to military and civilian personnel attached to the Academy and other personnel by permission

Naval Air Station, Patuxent River, Md. 20670

Training Director: E. G. Russell, Head, Employee Development Division; Mrs. Wanda Denton, Employee Development Specialist
Office: Naval Building 463, Civilian Personnel Department
Telephone: (301) 863-3734 or 863-3735

Representative for the University: Edward B. Wright
Telephone: (202) 676-7024
Open to military and civilian personnel of the Navy and to others by permission

Naval Oceanographic Office, Suitland, Md. 20390

Education Director: Mrs. Barbara Cain, Employee Development Specialist
Office: Room G-156, Building FOB 3
Telephone: (301) 763-1470
Representative for the University: Robert Engle
Telephone: (202) 676-7025
Open to military and civilian personnel of the Navy, employees of the Census Bureau, and others by permission

Naval Ordnance Station, Indian Head, Md. 20640

Education Director: H. J. Rhodes, Head, Employee Development Division; Mrs. D. Barron and Donald Jehlik, Employee Development Specialists
Office: Building D-71, Civilian Personnel Department
Telephone: (301) 743-5511, Extension 280 or 480
Representative for the University: Robert Engle
Telephone: (202) 676-7025
Open to military and civilian personnel of the Navy and to others by permission

Naval School of Health Care Administration, Bethesda, Md. 20014

Commanding Officer: Capt. R. M. Tennille, Jr., MSC, USN
Academic Director: LCdr. G. J. Pearce, MSC, USN
Office: Room 131, Building 141
Telephone: 295-1314
Representative for the University: Edward B. Wright
Telephone: 676-7024
Open to military personnel assigned to duty under instruction at the U.S. Naval School of Health Care Administration

Naval Ship Research and Development Center, Carderock, Md. 20007

Education Director: Mack A. Curtis, Head, Training Division
Office: Room 113A, Building 8
Telephone: 227-1204 or 227-1169
Representative for the University: Edward B. Wright
Telephone: 676-7024
Open to military personnel and civilian employees of the Naval Ship Research and Development Center and to others by permission

Naval Ship Research and Development Laboratory, Annapolis, Md. 21402

Education Director: Price Mosher
Office: Building 42, Training Center
Telephone: (301) 268-7711, Extension 8210
Representative for the University: Michael G. O'Connor
Telephone: (202) 676-7023
Open to military and civilian personnel of the Navy and to others by permission

Naval Ships Engineering Command (see Prince Georges Center Building)

Parklawn Building, Rockville, Md. 20852

Education Director: C. M. Hull
Office: Room 18A03, 5600 Fishers Lane
Telephone: 443-1965
Representative for the University: Frank Dulong
Telephone: 676-7029
Open to employees of the Department of Health, Education, and Welfare and to others by permission

Prince Georges Center Building (Naval Ships Engineering Command), Hyattsville, Md. 20788

Education Director: Frank Sharkey, Employee Development Specialist
Office: Room 118E, Civilian Personnel Office, 3700 East-West Highway
Telephone: 436-1104
Representative for the University: Robert Engle
Telephone: 676-7025
Open to everyone

Social Security Administration, Baltimore, Md. 21235

Education Director: Eric Levi
Office: Room 4-I-11, Annex Building, Division of Training and Career Development, 6401 Security Boulevard
Telephone: (301) 944-5000, Extension 5831
Representative for the University: Frank Dulong
Telephone: (202) 676-7029
Open to employees of the Social Security Administration and to others by permission

VIRGINIA

Building T-7, National Airport, Gravelly Point, Washington, D.C. 20315

Education Director and Chairman of the Department of Defense Education and Training Advisory Council: Philip F. Strauss
Office: Room 3C147, The Pentagon
Telephone: 697-8015 or 697-2823

ARMY MATERIEL COMMAND

Program Coordinator: Mrs. Lois Tucker
Office: Room 2524, Building T-7
Telephone: 697-9279
Employee Development Officer: Reading Black
Office: Room 1527, Building T-7
Telephone: 697-0341
Representative for the University: William C. Robinson
Telephone: 676-7064
Open to active duty military personnel and Department of Defense civilians, and to retired military personnel and other federal employees on a space-available basis

Bureau of Naval Personnel, Washington, D.C. 20370

Education Director and Chairman of the Department of Defense Education and Training Advisory Council: Philip F. Strauss
Office: Room 3C147, The Pentagon
Telephone: 697-8015 or 697-2823
Program Coordinator: John K. Wilkerson, Head, Training and Incentive Awards Section
Office: Room 1706, Arlington Annex
Telephone: 694-1269
Representative for the University: William C. Robinson
Telephone: 676-7064
Open to active duty military personnel and Department of Defense civilians and to retired military personnel and other federal employees on a space-available basis

CAPSO-Navy, Arlington, Va. 22203

Education Director: Donald E. Marquart; Miss Kathleen V. Sullivan, Employee Development Officer and Program Coordinator
Office: Room 1111, Ballston Towers No. 2, 801 North Randolph Street
Telephone: 692-4476 or 692-4477 or 692-4478 or 692-4479
Representative for the University: W. Grant Boyer
Telephone: 676-7026
Open to military and civilian personnel of the Department of Defense, and to others by permission

Commonwealth Building, 1320 Wilson Boulevard, Rosslyn, Arlington, Va. 22209

Education Director and Chairman of the Department of Defense Education and Training Advisory Council: Philip F. Strauss
Office: Room 3C147, The Pentagon
Telephone: 697-8015 or 697-2823
Program Coordinator: Miss Anna M. Brown
Office: Room 905, Commonwealth Building
Telephone: 694-5758
Representative for the University: W. Grant Boyer
Telephone: 676-7026
Open to active duty military personnel and Department of Defense civilians, and to retired military personnel and other federal employees on a space-available basis

Defense Supply Agency, Cameron Station, Alexandria, Va. 22314

Education Director: Philip C. Strang, Chief Employee Development Branch
Office: Room 8A111
Telephone: 694-7493
Representative for the University: John W. Gaffney
Telephone: 676-7063
Open to military and civilian personnel of the Department of Defense and to others by permission

Fort Belvoir, Va. 22060

Education Director: Eric Eber
Office: Building T-1483
Telephone: 664-3154 or 664-4546

Representative for the University: John W. Gaffney
Telephone: 676-7063
Open to military and civilian personnel of the Army and to others by permission

Fort Myer, Va. 22211

Educational Adviser: Lloyd B. Kidder
Office: Building 604, South Area, Post Education Center
Telephone: 697-0607
Representative for the University: W. Grant Boyer
Telephone: 676-7026
Open to military and civilian personnel of the Army and to others by permission

Hoffman Building, 2461 Eisenhower Avenue, Alexandria, Va. 22314

Education Director and Chairman of the Department of Defense Education and Training Advisory Council: Philip F. Strauss
Office: Room 3C147, The Pentagon
Telephone: 697-8015 or 697-2823
Building Administrator: John M. Johnson
Office: Room 156, Hoffman Building
Telephone: 274-0150
Representative for the University: John W. Gaffney
Telephone: 676-7063
Open to active duty and retired military personnel and all federal employees

Langley Senior High School, McLean, Va. 22101

Clinton E. DeBusk, Acting Principal
Office: 6520 Old Georgetown Pike
Telephone: 356-1962
Representative for the University: Herbert K. Berthold
Telephone: 676-7014
Open to everyone

Melpar Division of American Standard, Falls Church, Va. 22046

Education Director: Anthony B. DePasquale, Personnel Relations Manager
Office: 7700 Arlington Boulevard
Telephone: 560-5000, Extension 2450

USA COMPUTER SERVICES COMMAND
Donald Anderson, Chief, Technical Services and Training Division
Office: Melpar Annex
Telephone: 573-8274

Representative for the University: Herbert K. Berthold
Telephone: 676-7014
Open to employees of Melpar and others on a space-available basis

Nassif Building, 5611 Columbia Pike, Falls Church, Va. 22041

Education Director and Chairman of the Department of Defense Education and Training Advisory Council: Philip F. Strauss
Office: Room 3C147, The Pentagon
Telephone: 697-8015 or 697-2823

ARMY FINANCE AND COMPTROLLER INFORMATION SYSTEMS COMMAND

Program Coordinator: James E. Manion
Office: Room 410, Nassif Building
Telephone: 692-2159

MILITARY TRAFFIC MANAGEMENT AND TERMINAL SERVICE

Program Coordinator: Mrs. Joy MacCue
Office: Room 734, Nassif Building
Telephone: 692-0044

Representative for the University: John W. Gaffney
Telephone: 676-7063
Open to active duty and retired military personnel and all federal employees

Osbourn Senior High School, Manassas, Va. 22110

James W. Bailey, Principal
Office: 200 Tudor Lane
Telephone: (703) 368-9276
Representative for the University: Herbert K. Berthold
Telephone: (202) 676-7014
Open to everyone

The Pentagon, Washington, D.C. 20310

Director of the Pentagon Education Center, Chairman of the Department of Defense Education and Training Advisory Council, and Education Officer for the U.S. Army: Philip F. Strauss
Assistant to the Director: George L. Bowman
Office: Room 3C147
Telephone: 697-2823 or 697-6805 or 697-8015

U.S. AIR FORCE

Education Officer: Anthony J. Witkowski
Office: Room 5E410
Telephone: 697-1863 or 697-7074

Representative for the University: William C. Robinson, Pentagon Desk, Reception Center on the Concourse
Pentagon Telephone: 697-3141
University Telephone: 676-7064
Open to active duty military personnel and Department of Defense civilians, and to retired military personnel and other federal employees on a space-available basis

Reston, Va. 22070

HUNTERS WOODS ELEMENTARY SCHOOL

O Stuart Chaplain, Jr., Principal
Office: 2401 Colts Neck Road
Telephone: 437-6030

LAKE ANNE ELEMENTARY SCHOOL

Mrs. Emilie McDaniel, Education Secretary
Office: 11510 North Shore Drive
Telephone: 437-3628

REDEEMER UNITED METHODIST CHURCH

Rev. J. Robert Regan, Jr.
Office: 11508 North Shore Drive
Telephone: 471-5295

Representative for the University: Herbert K. Berthold
Telephone: 676-7014
Open to everyone

Stonewall Jackson Senior High School, Manassas, Va. 22110

Charles Wildman, Principal
Office: 205 Lomond Drive
Telephone: (703) 368-9156
Representative for the University: Herbert K. Berthold
Telephone: (202) 676-7014
Open to everyone

U.S. Marine Corps Base, Quantico, Va. 22134

Education Officer: Major M. Horowitz, USMC
Office: Education Office, Building 2005
Telephone: (703) 640-2826
Representative for the University: John W. Gaffney
Telephone: (202) 676-7063
Open to military personnel and their dependents and civilian personnel attache
the Marine Corps Base. Others may be admitted by permission.

Vint Hill Farms Station, Warrenton, Va. 22186

Education Director: Eric Eber
Telephone: (703) 664-3154
Station Education Officer: Maurice Lewis, Jr.
Telephone: (703) 347-6602
Representative for the University: Herbert K. Berthold
Telephone: (202) 676-7014
Open to everyone

OFF-CAMPUS LOCATIONS OF EDUCATION COURSES FOR TEACHERS

DISTRICT OF COLUMBIA

Representative for the University: John A. Morrow
Telephone: 676-7015

MARYLAND

Anne Arundel County Public Schools, Annapolis, Md. 21402

Edwin Copeland, Assistant in Personnel
Office: Anne Arundel County Board of Education, Green Street
Telephone: (301) 268-3345
Representative for the University: Douglas Nelson
Telephone: (202) 676–7481

Baltimore City Public Schools, Baltimore, Md. 21218

Co-directors of Personnel: Marvin C. Davis, Kenneth Horvath
Office: 3 East 25th Street
Telephone: (301) 467-4000, Extension 451
Representative for the University: Frank Dulong
Telephone: (202) 676-7029

Caroline County Public Schools, Denton, Md. 21629

Fred C. Usilton, Director of Instruction
Office: Law Building, Market Street
Telephone: (301) 479-1460
Representative for the University: Douglas Nelson
Telephone: (202) 676-7481

Dorchester County Public Schools, Cambridge, Md. 21613

John T. Comer, Assistant Superintendent
Office: 403 High Street
Telephone: (301) 228-4747
Representative for the University: Douglas Nelson
Telephone: (202) 676-7481

Frederick Community College, Frederick, Md. 21701

H. Mithelner, Dean of Instructional Services
Office: Opossumtown Pike
Telephone: (301) 662-0101
Representative for the University: Frank Dulong
Telephone: (202) 676-7029

Kent County Public Schools, Chestertown, Md. 21620

Robert J. Eckert, Director of Instructional Services
Office: 400 High Street
Telephone: (301) 778-1595
Representative for the University: Douglas Nelson
Telephone: (202) 676-7481

Montgomery County Public Schools, Rockville, Md. 20850

Charles Proctor, Director, Staff Development
Office: Montgomery County School Board, 850 North Washington Street
Telephone: 762-5000, Extension 395
Representative for the University: William C. Shelton
Telephone: 676-7249

Prince Georges County Public Schools, Upper Marlboro, Md.

Edward Turner, Director of Staff Development
Office: Prince Georges County School Board
Telephone: 627-4800
Representative for the University: William C. Shelton
Telephone: 676-7249

Queen Anne County Public Schools, Centreville, Md. 21617

John H. Webb, Superintendent
Telephone: (301) 758-0855
Representative for the University: Douglas Nelson
Telephone: (202) 676-7481

Somerset County Public Schools, Princess Anne, Md. 21853

George F. Carrington, Director of Instruction
Office: Prince William Street
Telephone: (301) 651-1616
Representative for the University: Douglas Nelson
Telephone: (202) 676-7481

Talbot County Public Schools, Easton, Md. 21601

Arthur R. Higginbottom, Director of Instruction
Office: Washington and Dover Streets
Telephone: (301) 822-0330
Representative for the University: Douglas Nelson
Telephone: (202) 676-7481

Tri-Counties Public Schools, Md.

Representative for the University: William C. Shelton
Telephone: (202) 676-7249

CALVERT COUNTY PUBLIC SCHOOLS, PRINCE FREDERICK, MD. 20678

David L. Brown, Administrative Assistant
Office: Calvert County School Board, Dares Beach Road
Telephone: (301) 535-1700

CHARLES COUNTY PUBLIC SCHOOLS, LA PLATA, MD. 20646

Elwood M. Leviner, Assistant in Personnel
Office: Charles County Board of Education, Health and Education Building
Telephone: (301) 934-4671

ST. MARY'S COUNTY PUBLIC SCHOOLS, LEONARDTOWN, MD. 20650

Kenneth D. Rigby, Assistant in Personnel
Office: St. Mary's County School Board of Health Building
Telephone: (301) 475-9141

Wicomico County Public Schools, Salisbury, Md. 21801

Paul S. Hyde, Supervisor of Instruction
Office: Long Avenue and Mt. Herman Road
Telephone: (301) 742-5128
Representative for the University: Douglas Nelson
Telephone: (202) 676-7481

Worchester County Public Schools, Snow Hill, Md. 21863

Office: 107 East Market Street
Telephone: (301) 632-2582
Representative for the University: Douglas Nelson
Telephone: (202) 676-7481

VIRGINIA

Alexandria Public Schools, Alexandria, Va. 22301

Richard B. Hills, Staff Development Officer
Office: 1005 Mount Vernon Avenue
Telephone: 549-1390
Representative for the University: Herbert K. Berthold
Telephone: 676-7014

Arlington County Public Schools, Arlington, Va. 22201

Joseph Guton, Staff Development Officer
Office: 1426 North Quincy Street
Telephone: 558-2883
Representative for the University: Herbert K. Berthold
Telephone: 676-7014

Fairfax County Public Schools, Fairfax, Va. 22150

Frank Elliott, Staff Development Officer
Office: 10700 Page Avenue
Telephone: 691-3261
Representative for the University: Herbert K. Berthold
Telephone: 676-7014

Falls Church City Public Schools, Falls Church, Va. 22046

J. Earle Phillips, Staff Development Officer
Office: 419 West Broad Street
Telephone: 532-1181
Representative for the University: Herbert K. Berthold
Telephone: 676-7014

Fauquier County Public Schools, Warrenton, Va. 22186

Office: 10 Hotel Street, Warren Green Building
Telephone: (703) 347-2320
Representative for the University: John A. Morrow
Telephone: (202) 676-7015

Loudon County Public Schools, Leesburg, Va. 22075

Alvin G. Sowards, Staff Development Officer
Mrs. Ruth D. Schulke, Supervisor, Elementary Education
Office: Loudon County School Board, 20 Union Street
Telephone: (703) 777-2221
Representative for the University: Herbert K. Berthold
Telephone: (202) 676-7014

Northern Virginia Community College, Annandale, Va. 22003

Representative for the University: John A. Morrow
Telephone: 676-7015

Prince William County Public Schools, Manssas, Va. 22110

Office: Tudor Lane
Telephone: (703) 361-4153
Representative for the University: Herbert K. Berthold
Telephone: (202) 676-7014

TIDEWATER CENTER

Director, George Washington University Tidewater Center: Robert C. Sedwick
Office: 2019 Cunningham Drive, Hampton, Va. 23366
Telephone: (703) 838-8444
Open to any qualified individual
Serves the cities in the Tidewater area of Virginia and the following military installations:

Camp Elmore, Norfolk, Va. 23521

Education Officer: 1st Lt. R. M. McKissick, USMC
Telephone: (703) 444-6875

Fort Eustis, Va. 23604

Education Director: John Williams
Telephone: (703) 878-5508

Fort Lee, Va. 23801

General Education Director: William P. Brantley
Telephone: (703) 734-1073

Fort Monroe, Va. 23351

Education Director: Henry Stone
Telephone: (703) 727-2454

Fort Story, Virginia Beach, Va. 23459

Education Director: Miss Kay Maydanis
Telephone: (703) 428-5232

Guided Missile School/Fleet Anti-Air Warfare Training Center, Dam Neck, Virginia Beach, Va. 23461

Educational Adviser: W. R. Hudgins
Telephone: (703) 425-4473

Langley Air Force Base, Va. 23365

Education Services Officer: Robert J. Dewey
Telephone: (703) 764-5757

NASA Langley Research Center, Langley Field, Hampton, Va. 23365

Head, Training and Education Services Branch: Malcolm P. Clark
Telephone: (703) 827-2611

Naval Air Station, Norfolk, Va. 23511

Educational Services Officer: Lt. (Mrs.) E. R. Kirksey, USN
Telephone: (703) 444-7694

Naval Air Station, Oceana, Virginia Beach, Va. 23460

Educational Services Officer: Lt. (Miss) R. L. Verry, USN
Telephone: (703) 425-2613

Naval Amphibious Base, Little Creek, Norfolk, Va. 23521

Educational Services Officer: Lt. (Mrs.) M. M. Sowa, USN
Telephone: (703) 464-7811

Naval Supply Center, Norfolk, Va. 23512

Training Director: Mrs. Mary K. Lawson
Telephone: (703) 444-4912

U.S. Atlantic Fleet, U.S. Naval Base, Norfolk, Va. 23511

Educational Services Officer: Warrant Officer George Pearman, USN
Telephone: (703) 444-6945

U.S. Naval Hospital, Portsmouth, Va. 23708

Training Officer: Cdr. E. E. Fowler, USN
Telephone: (703) 397-6581, Extension 242

U.S. Naval Station, Norfolk, Va. 23511

Education Director: William Gill
Telephone: (703) 444-7272



Thomas E. Morgan (l.), Director of Academic Staffing, checks staff require-ments for off-campus courses with Mrs. Annette Antzes, Assistant to the Di-rector.

COURSES OF INSTRUCTION

ON THE FOLLOWING PAGES OF THIS CATALOGUE, under the alphabetically arranged names of the departments of instruction, are listed the courses of instruction. Courses carrying the designation "Campus Course" are normally offered only on campus. The courses are subject to change. The University reserves the right to withdraw any course announced.

EXPLANATION OF COURSE NUMBERS

Courses are assigned triple numbers, all of which are listed in the *Off-campus Schedule of Classes*, published three times each year. The first is a serial number assigned by the College of General Studies at the time of registration indicating the location of off-campus centers. The second number is the number assigned to the particular department. The third number, the only one of the three which appears in this catalogue, is the course number assigned by the department; this number indicates the academic level of each course, as follows:

First-group courses.—Courses numbered from 1 to 100 are planned for students in the freshman and sophomore years. With the approval of the adviser and the dean, they may also be taken by juniors and seniors. In certain instances, they may be taken by graduate students to make up undergraduate deficiencies or as prerequisite to advanced courses, but they may not be credited toward a higher degree.

Second-group courses.—Courses numbered from 101 to 200 are planned for students in the junior and senior years. They may be taken for graduate credit only upon the approval of the dean and the instructor at the time of registration. Such approval is granted only with the provision that students must complete additional work in order to receive graduate credit.

Third-group courses.—Courses numbered above 200 are planned primarily for graduate students. They are open, with the approval of the instructor, to qualified seniors; they are not open to other undergraduates. Qualified seniors registering for Accounting, Business Administration, Health Care Administration, Management Science, or Public Administration courses must have a 3.00 average, the prior approval of the department chairman who is responsible for the graduate course, the prior approval of the faculty adviser, and the prior approval of the Dean of the School of Government and Business Administration.

SEMESTER HOURS OF CREDIT

The number of semester hours of credit given for the satisfactory completion of a course is, in most cases, indicated in parentheses after the name of the course. Thus, a year course giving 3 hours of credit each semester is marked (3–3), and a semester course giving 3 hours of credit is marked (3). A semester hour usually consists of the completion of one fifty-minute period of class work or of one laboratory period a week for one semester.

ABBREVIATIONS

In the description of courses in this catalogue, the following abbreviations are used:

Acct	Accounting
Anth	Anthropology
Art	Art
B Sc	Biological Sciences
B Ad	Business Administration
Cart	Cartography
Chem	Chemistry
Clas	Classics
Asia	East Asian Languages and Literatures
Econ	Economics
Educ	Education
Engl	English
Epid	Epidemiology and Environmental Health
Fren	French
Geod	Geodesy
Geog	Geography and Regional Science
Geol	Geology
Geop	Geophysics
Germ	Germanic Languages and Literatures
HCA	Health Care Administration
Hist	History
Hum	Humanities
I Af	International Affairs
Ital	Italian
L Am	Latin American Civilization
Mgt	Management Science
Math	Mathematics
Mus	Music
Ocea	Oceanography
Phar	Pharmacology
Phil	Philosophy
PE	Physical Education
Phys	Physics
P Sc	Political Science
Psyc	Psychology
P Ad	Public Administration
Rel	Religion
Slav	Slavic Languages and Literatures
Soc	Sociology
Span	Spanish
S Ed	Special Education
Sp&D	Speech and Drama
Stat	Statistics

Accounting

Chairman: A.J. Mastro, Associate Professor of Accounting; Government 302. Telephone: 676-6055

1–2 Introductory Accounting (3–3)

Basic understanding of accounting information: accounting concepts, procedures, analyses, and reports as an integral part of a broad management information system; the accounting measurement and communication of significant economic and financial data. Prerequisite to Acct 2: Acct 1. Students who have received credit for Acct 115 cannot receive credit for Acct 1–2.

101 **Cost and Budgetary Control** (3)
(Formerly Cost Accounting)
Topics of prime managerial concern: cost behavior and volume-profit relationships, responsibility accounting, standard costs, flexible budgets, cost structures for control and motivation, relevant costs for nonroutine decisions; cost concepts. Prerequisite: Acct 1–2. Students who have received credit for Acct 193 or 215 cannot receive credit for Acct. 101.

111 **Financial Statement Analysis** (3)
The analysis and interpretation of financial statements for the guidance of management, directors, stockholders, and creditors. Prerequisite: Acct 1–2.

115 **Survey of Financial Accounting** (3)
(Formerly Survey of Accounting)
Development, presentation, and interpretation of financial accounting data necessary to the management process. Students who have received credit for Acct 1–2 cannot receive credit for Acct 115.

121 **Intermediate Accounting** (3)
In-depth study of accounting functions and basic theory: acquisition of assets and services, income and equity accounting, preparation and analysis of financial statements. Prerequisite: Acct 1–2.

122 **Intermediate Accounting** (3)
An in-depth study of special topics: partnership, consignment, installment, liquidation, retail, estate, and trust accounting. Prerequisite: Acct 121.

141 **Governmental Accounting** (3)
Appropriation, encumbrance, and fund accounting for governmental and institutional entities. Prerequisite: Acct 1–2.

144 **Federal Accounting** (3)
Accounting procedures in the federal government, with emphasis on agency-level accounts and accounting support for cost-based budgets. Prerequisite: Acct 141.

161 **Federal Income Taxation** (3)
Federal income tax concepts applicable to individuals and corporations, differences between tax accounting and financial accounting.

171 **Auditing** (3)
Principles and procedures of auditing: generally accepted auditing standards, internal control, audit objectives and reports, form-preparation-use of audit work papers, audit evidence. Prerequisite: Acct 121.

181 **Accounting Systems** (3)
Organization and use of accounting information: fundamentals of accounting data origination, classification, control, and reporting; nature of systems design; problems encountered in the development, design, and installation of accounting systems; accounting communication patterns. Prerequisite: Acct 101, 171.

191 **Advanced Accounting** (3)
Application of accounting theory to special areas: consolidated statements, business combinations, earnings per share, foreign exchange, price-level

adjusted statements, source and application of funds. Prerequisite: Acct 121.

193 **Business Budgeting** (3)
Principles, techniques, and procedures involved in the development, installation, and operation of a system of budgetary control to aid management. Prerequisite: Acct 1–2. Students who have received credit for Acct 101 cannot receive credit for Acct 193.

215 **Survey of Managerial Accounting** (3)
Study of the nature, preparation, analysis, and interpretation of accounting reports primarily from the management point of view. Prerequisite: Acct 1–2 or 115. Students who have received credit for Acct 101 cannot receive credit for Acct 215.

231 **Contemporary Accounting Theory** (3)
Accounting principles and concepts and recent theories concerned with the valuation and amortization of assets and determination of income. Prerequisite: 6 semester hours of accounting.

241 **Accounting and Related Disciplines** (3)
Interrelationships of accounting and behavioral sciences, economics, mathematical methods, operations research. Prerequisite: 6 semester hours of accounting.

262 **Business Income Taxation** (3)
Federal income tax concepts applicable to corporations, partnerships, and their owners; emphasis on tax planning factors in business decisions and tax research.

275 **Contemporary Auditing Theory and Procedures** (3)
(Formerly Internal Control and Auditing)
Study of generally accepted auditing standards: internal control and internal auditing, application of statistical sampling to auditing, audit of electronic data processing systems. Prerequisite: Acct 1–2 or 115.

276 **Management Planning and Control** (3)
An integrative case study approach to formal management systems for planning, control, and decisions: grouping of activities, value indices for organizational sub-units, transfer pricing, contemporary control systems, accounting framework and cycle, systems for project management. Prerequisite: Acct 1–2 or 115.

282 **Accounting Information Systems** (3)
Development and application of accounting system theory, including analysis, design, and implementation. Integration of automatic data processing, accounting systems, and management information systems. Prerequisite: Acct 1–2 or 115.

295 **Seminar in Accounting** (3)
Selected accounting studies: critical analysis and evaluation developed in seminar discussions and papers. Prerequisite: Acct 1–2 or 115.

Anthropology

Chairman: R.K. Lewis, Associate Professor of Anthropology; X-11, Telephone: 676-6075

1–2 **Introductory Anthropology** (3–3)

Anth 1: survey of man's origin, physical evolution, and culture history. Anth 2: survey of the world's cultures, illustrating the principles of cultural behavior.

Art

Chairman: L.P. Leite, Professor of Art; Stuart Basement (front), Telephone: 676-6085

31–32 **Survey of Western Art** (3–3)

Survey of the arts in the Western world from prehistoric to modern times. A foundation for further study in the history of art.

71–72 **Introduction to the Arts in America** (3–3)

Painting, sculpture, and architecture of America, with selected references to crafts and popular arts. Art 71: from Colonial beginnings to the Republican Age. Art 72: from early 19th century to the present.

110 **Contemporary Art** (3)

Painting and sculpture in 20th century Europe.

113 **Baroque Art in Italy** (3)

Development of painting, sculpture, and architecture in 16th and 17th century Italy.

Biological Sciences

Chairman: A.H. Desmond, Professor of Zoology; Bell 314. Telephone: 676-6090

BIOLOGY

3–4 **Introductory Biology for Nonscience Majors** (3–3) (Campus Course)

Lecture (2 hours), laboratory (2 hours). Survey of biological principles; emphasis on man as a functional organism in his environment. Material fee, $12 a semester.

11–12 **Introductory Biology for Science Majors** (4–4) (Campus Course)

Lecture (3 hours), laboratory (3 hours). Biological principles and problems designed to furnish a base for advanced studies in biology and related sciences. Required of all prospective biology, botany, and zoology majors. Material fee, $15 a semester.

Business Administration

Chairman: H.R. Page, Professor of Business Administration; Government 302. Telephone: 676-6115.

51 **Introduction to Business** (3)
Structure, activities, and problems of business enterprise; its contribution to the individual and to society; careers in business.

101 **The Business Environment** (3)
Economic and legal environment of business enterprise; social and political influences; contemporary problems and issues.

102 **Fundamentals of Management** (3)
Planning, organizing, directing, coordinating, and controlling activities of the administrative unit; evolution of management thinking.

103 **Institutional Management** (3)
Philosophy of hospital administration: special services, food service, maintenance, internal review.

105 **Personnel Management** (3)
The labor force and labor markets. Industrial personnel and manpower programs, organizations and policy in personnel activities.

106 **Problems in Personnel Management** (3)
Principles and problems of personnel management and industrial relations illustrated by cases drawn from industry and government. Prerequisite: B Ad 105.

107 **Collective Bargaining** (3)
Characteristics of American unionism and collective bargaining; economic, social, and public policy considerations. Management's role in the negotiation and administration of collective bargaining agreements. Prerequisite: B Ad 105 or permission of instructor.

109 **Office Management** (3)
Organization and management of the office, office and information systems, planning and execution of work, systems analysis supervision problems.

111–12 **Personnel Records Administration** (3–3)
B Ad 111: basic principles, techniques, and methods used in collecting, processing, evaluating, and storing personnel records of all kinds. B Ad 112: problems and cases in special kinds of record-keeping and record administration.

113 **Real Estate** (3)
Principles of urban real estate practice; leasing and property management, valuation, appraisal, financing, taxation, urban growth, urban renewal.

131 **Business Finance** (3)
Techniques of the financial manager in analyzing capital requirements and methods of acquiring funds; planning efficient use of capital. Asset management, financial analysis, short-term and long-term sources of funds, capital budgeting, stockholder relationships, long-range planning.

Extensive use of problems. Prerequisite: Acct 1–2; Econ 1; Math 30, 31; Stat 51.

132 **International Business Finance** (3)

Introduction to principles, practices, problems, and institutions of international finance. Emphasis on international financial markets, exchange rates, balance-of-payments restraints, and governmental policies. Prerequisite: Econ 1–2.

135 **Managerial Finance** (3)

Functions and objectives of financial management; problems of internal financial analysis, forecasting, planning, and control; management of corporate capital; problems of capital supply; case studies. Prerequisite: B Ad 131.

138 **Investment and Portfolio Management** (3)

Study of the theory and principles of security analysis and portfolio management, including analysis of the national economy, industry, company, and security markets. Risk-reward and computer-aided analysis. Prerequisite: Acct 1–2, B Ad 131.

141 **Basic Marketing Management** (3)

Introduction to marketing and marketing management in relation to our total economy and business management, consumer and demand analysis, retailing, wholesaling, major marketing management problems and policies with emphasis on major decision areas and tools. Prerequisite: Econ 1–2.

143 **Marketing Research** (3)

Principles and practices of marketing research with particular emphasis on basic methods and techniques, sources and interpretation of data, and presentation of results. Prerequisite: B Ad 141.

158 **Physical Distribution Management** (3)

Distribution from shipper's point of view: problems of plant location, inventory control, warehousing; traffic management emphasized, including private carriage. Prerequisite: Econ 1–2.

161 **Commercial Law: Contracts, Sales, Agency, Bailments** (3)

162 **Commercial Law: Negotiable Instruments, Property, Mortgages** (3)

171 **Principles of Transportation** (3)

Impact of intercity transportation systems on society. Emphasis on modal differences in development, economic characteristics, and regulation. Prerequisite: Econ 1–2.

172 **Public Utilities** (3)

Legal and economic meaning of public utility concept; development, services, economic characteristics, rate-making, and regulation of utility industries, with emphasis on electric, gas, and telephone industries. Prerequisite: Econ 1–2.

173 **Transportation Systems Management** (3)

Comparative study, from the standpoint of various carrier modes, of management problems common to all modes of domestic and international transportation. Prerequisite: Econ 1–2.

174 **Urban Transportation** (3)

Problems of developing balanced transportation systems for urban areas—area needs, modal evaluation, cost effectiveness, finance, and marketing. Prerequisite: Econ 1–2 or equivalent.

175 **Introduction to Foreign Trade** (3)

The physical movement of goods in international business; conditions essential for successful trading; development of a hypothetical export shipment, including examples of documentation required and discussion of procedural problems from a management point of view. Emphasis on ocean marine insurance and export traffic management policy. Prerequisite: Econ 1–2.

178 **Management of International Business Operations** (3)

Analysis of overseas projects according to purpose and type of organization; case studies involving development and management of overseas marketing programs and other operations in different world areas. Prerequisite: B Ad 175 or permission of instructor.

181 **Manufacturing Production** (3)

Basic principles and methods of manufacturing production. Manufacturing facilities, plant and equipment. Illustrations selected from various process and fabrication industries.

191 **Business Reports and Analyses** (3)

Sources of management information, array and analysis of data, interpretation and presentation of findings.

193 **Management Communication** (3)

Survey of communication problems, written communication, style and format, oral briefing and presentation, group leadership, rapid reading, completed staff work, related subjects.

198 **Case Problems in Management** (3)

Principles and techniques of management illustrated by cases drawn from business and industry. Prerequisite: B Ad 102, 105, 131, 141.

202 **Relations of Government to Business** (3)
(Formerly Mgt 287)

Legal foundations of the power of government to regulate and promote business, regulatory and promotional activities of the government, functions of the independent regulatory agencies, antitrust activities of government, monetary and fiscal policy, and government regulation of labor-management relations.

208 **Personnel Management and Industrial Relations** (3)

Survey of personnel management practices and procedures, including labor-management relations.

209 **Seminar: Personnel Management** (3)

Industrial personnel and manpower management, research in advanced problems.

211 **Leadership and Executive Development** (3)
(Formerly Mgt 211)

Theories of managerial leadership; issues and problems associated with

leadership in large organizations and at higher management levels; executive selection and development. Prerequisite: Mgt 201 or permission of instructor.

212 **Unionism and Collective Bargaining** (3)

The American labor movement. Collective bargaining and the conduct of labor relations under collective bargaining agreements.

213 **Current Issues in Unionism, Collective Bargaining, and Labor Relations** (3)

Current problems and issues. Prerequisite: B Ad 212.

225 **Seminar: Manufacturing Production** (3)

Examination of production technology, including new manufacturing processes, materials, products, equipment, and facilities. Implications of emerging technology in managing the production function. Cases, individual student research. Prerequisite: B Ad 181 or permission of instructor.

231 **Financial Decision-making** (3)

Functions and objectives of financial management, asset management, problems of internal financial analysis, rate-of-return analysis, financial forecasting, problems of capital demand and supply. Prerequisite: Acct 115 or equivalent, B Ad 131.

232 **Capital Resource Management** (3)

Problems of capital acquisition, costs, rationing, structure; dividend policy. Prerequisite: B Ad 231.

233 **International Business Finance** (3)

Case development and analysis of problems in international business finance. Impact of the evolving international payments system on business. Prerequisite: B Ad 131 or equivalent.

237 **Investment Analysis** (3)

Risk-reward analysis of security investments including analysis of national economy, industry, company, and market; introduction to portfolio management; emphasis on theory, professional application, and computer methods. Prerequisite: B Ad 131.

238 **Seminar: Investment and Portfolio Management** (3)

Portfolio management theory, application, and computer modeling. Independent research on investment analysis and portfolio management with emphasis on theory, cases, and computer applications. Prerequisite: B Ad 237.

241 **Advanced Marketing Management** (3)

Marketing management problems and policies in major decision areas of product planning, channels of distribution, advertising, personal selling, sales promotion, pricing, and development of integrated marketing programs. Tools useful in decision-making. Case analysis.

243 **Seminar: Marketing Research** (3)

Research as an aid to decision-making and increased efficiency in marketing, marketing research process, critical appraisal of methods and results, applications of marketing research. Cases, selected readings, and research projects.

248 **International Marketing** (3)

Organization for international marketing, foreign demand analysis, product development and policies, marketing structure and trade channels, advertising and promotion problems and policies, pricing, and legal aspects. Emphasis on development of effective international marketing strategy.

255 **International Trade** (3)

Research, analysis, and discussion of public and private foreign trade institutions; principles and theories of international trade; role of foreign trade and investment on U.S. balance of payments; problems and changing patterns in U.S. trade in the Western Hemisphere. Guest lecturers.

256 **Seminar: International Trade** (3)

Research, analysis, and discussion of international problems arising from economic integration; emphasis on European Economic Community; U.S. trade with developing nations; East-West trade problems and potential; foreign trade policy of the United States. Guest lecturers. Prerequisite: B Ad 255 or permission of instructor.

257 **Operation of the Multinational Firm** (3)

Analysis of problems in international business by use of the case method, including international market entry and expansion; operating policies, procedures, and problems of multinational companies; developing executives for international business. Prerequisite: advanced Master's degree standing.

261 **Managerial Economics I** (3)

Managerial applications of economic analysis. Applications of economic theory and statistics to business decisions involving demand, production, cost, profits, investments, and inventories. Prerequisite: Econ 217, Mgt 203, Stat 111 and 112; or equivalent; or permission of instructor.

262 **Managerial Economics II** (3)

Managerial applications of economic analysis. Use of economic theory and statistics in business forecasting; interpretation of economic trends and developments; analysis of governmental economic policies as they affect business. Prerequisite: Econ 218, Mgt 203, Stat 111 and 112; or equivalent; or permission of instructor.

275 **Seminar: Transportation** (3)

Problems and special areas of interest in transportation. Prerequisite: B Ad 171 or permission of instructor.

279 **Purchasing and Materials Management** (3)

Industrial purchasing and materials management principles and practices. Organization and functions in materials management. Determination of requirements, source selection, buying practices, policies, and ethics.

280 **Procurement and Contracting** (3)

Overview of procurment and contracting; emphasis on federal government buying policies, practices, and procedures.

282 **Government Contract Administration** (3)

Surveillance over performance of contract. Rights and obligations, changes, suspension of work, default, termination for the convenience of

the government, inspection, warranties, procedures for the settlement of controversies on government contracts.

283 **Pricing and Negotiation** (3)

Scope and objectives of negotiated procurement; participation and relationships of functional elements of the organization; preparation, conduct, and recording of negotiations; analysis of contract cost, price, profit, investment, and risk; cost principles; incentives; relationship of contract type to work requirements; techniques of negotiation. Prerequisite: B Ad 280 or permission of instructor.

285 **Systems Procurement and Project Management** (3)

Development and procurement of major systems. Project management and the impact of this technique on the procurement process. Procurement planning—from concept formulation through contract definition, development, and manufacture.

293 **Business Research** (3)

May be repeated once for credit.

295 **Business Decision Simulation** (3) (Campus Course)

Managerial decision-making in a diversified multinational firm. Students are organized into teams in a simulated competitive environment in which a complex situation is played out using computers. Prerequisite: advanced Master's or doctoral degree standing.

297 **Case Studies in Business Administration** (3)

Cases covering the whole range of business activity. Analysis of operational situations and policy issues. Developing and implementing solutions to managerial problems. Prerequisite: advanced Master's degree standing.

299 **Thesis Seminar** (3) (Campus Course)

Examination of thesis standards, research philosophy and methodology.

300 **Thesis Research** (3)

Cartography*

Program Adviser: Hyman Orlin, Professorial Lecturer in Geodetic and Cartographic Science; Telephone: 946-3557

1–2 **Introduction to Cartography** (3–3)

The use of maps. History of mapping. Introduction to the fundamental concepts of topography, hydrography, and cartography. Characteristics and uses of different kinds of maps and charts, symbolization, representation of relief, geographic and grid coordinates, attributes of various projections, reliability. Making maps. Fundamental concepts of geodesy and geomorphology as applied to maps and charts, surveying methods, application to aerial photography, photo interpretation, map design, compilation and reproduction. Prerequisite to Cart 2: Cart 1.

* Affiliated with the Department of Geography and Regional Science

103–4 **Photo Interpretation** (3–3)

Photo interpretation and its uses. History of photo interpretation. Fundamental concepts of image interpretation, topography, hydrology, vegetation, and man-features. Parameters affecting photo interpretation. Civil and military interpretation. Measurements, keys, and diagnostic techniques; reliability. Infrared and radar photo interpretation. Satellite photography. Prerequisite or concurrent registration: Geod 17. Prerequisite to Cart 104: Cart 103.

107 **Physiography** (3)

Development of physiographic concepts; the earth's crust, weathering, climate, and denudation; stream, shore, wind, and ice processes; glaciation; physiographic regions. Prerequisite: Cart 2.

108 **Climatology** (3)

Introduction, causes for climate and weather, air mass movements, water mass movements, physical features of boundaries. Tropics, subtropics, humid and dry continentals, subarctics.

111 **Cartographic Techniques** (3)

State-of-the-art orientation in the techniques and procedures currently used in cartographic agencies, including field methods, evaluation of source maps, use of scribing and contact screens in color separation, shaded relief, map reproduction, and associated managerial practices. Prerequisite: Cart 2.

112 **Advanced Cartography** (3)

Automated cartography, including computer-assisted map compilation, statistical mapping, automated color separation, and revision systems. Aerospace cartography, including orbital navigation, lunar, and planetary charting. Prerequisite: Cart 111.

Chemistry

Chairman: C.R. Naeser, Professor of Chemistry; Corcoran 104, Telephone: 676-6120

PHYSICAL SCIENCE

3–4 **Fundamentals of Physical Science for Nonscience Majors** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Chem 4. Lecture (2 hours), laboratory (3 hours). Selected topics from chemistry, physics, astronomy, and geology are integrated to introduce the nonscience major to the basic methods and achievements of physical science. Laboratory fee, $11 a semester.

CHEMISTRY

11–12 **General Chemistry** (4–4) (Campus Course)

A year course: credit toward a degree at this University given on completion of Chem 12. Lecture (3 hours), laboratory (3 hours), recitation (1 hour). Elementary course in general chemistry, including qualitative

analysis. Prerequisite: one year of high school algebra. Laboratory fee, $18 a semester.

East Asian Languages and Literatures

Acting Chairman: Chung-wen Shih, Professor of Chinese; Suite 714, 2100 M Street. Telephone: 676-7106

CHINESE

Placement Examination: A standardized placement examination given before registration is required of all entering students who wish to continue in college the language begun in high school. Upon completion of the examination, assignment is made to the appropriate course, with credit assigned on the usual basis.

1–2 **Beginning Mandarin Chinese, Level I** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Asia 2. Classroom (3 hours), laboratory (1 hour). Fundamentals of grammar and pronunciation with graded reading and practice in writing. Listening comprehension and oral practice in language laboratory. Laboratory fee, $17.50 a semester.

3–4 **Beginning Mandarin Chinese, Level II** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Asia 4. Classroom (3 hours), laboratory (1 hour). Continuation of grammar and spoken Chinese with more emphasis on the written language and reading. Aural training, oral practice in language laboratory. Prerequisite: Asia 2 or equivalent. Laboratory fee, $17.50 a semester.

Economics

Chairman: Henry Solomon, Professor of Economics; C-617. Telephone: 676-6150

Departmental prerequisite: Econ 1–2 is prerequisite to all other courses in Economics.

1–2 **Principles of Economics** (3–3)

Lecture (2 hours), recitation (1 hour). Survey of the major economic principles, institutions, and problems in contemporary life. Econ 1 is prerequisite to Econ 2.

121 **Money and Banking** (3)

Nature of money, credit, commercial banking, and other financial institutions in the U.S. monetary system.

*179–80 **U.S. Economic History** (3–3)

Process of economic growth from Colonial times to the present. Development of various sectors in the economy—such as agriculture, transportation, manufacturing, and banking—and their interdependence. Econ 179: 1607–1865. Econ 180: 1865 to present.

* Interdepartmental course offered by the departments of Economics and History

217–18 **Survey of Economics** (3–3)
For graduate students in fields other than economics; not open to graduate students in economics. Econ 217: price theory. Econ 218: income and employment theory.

220 **Survey of Principles and Issues in Economics** (3)
For students in the Master of Science in Administration degree program. Survey of economic theory and its application to contemporary economic problems.

*251 **Economic Development** (3)
Theories and problems of economic growth; special attention to the underdeveloped countries.

Education

Chairman: H.G. Detwiler, Professor of Education; C-514, Telephone: 676-6940

Departmental prerequisite: a degree from an accredited institution and adequate professional preparation are prerequisite to courses in Education numbered from 201 to 400.

108 **Human Development, Learning, and Teaching** (3)
Lecture (2 hours), conference (1 hour), field work (3 hours). Principles of effective teaching based on an understanding of human development and the nature of learning. Prerequisite: Psyc 22.

112 **Educational Measurement** (3)
Scope, needs, services to students, selection and construction of teacher-made tests, interpretation of tests for evidence purposes. Prerequisite: Educ 108 and 123.

113 **Elementary School Art** (3)
Lecture and laboratory (3 hours), field work as arranged. For undergraduates in the elementary school curriculum. Materials and methods. Material fee, $5.

114 **Elementary School Music** (3)
Lecture (2 hours), field work (2 hours). For undergraduates in the elementary school curriculum. Materials and methods.

†115 **Elementary School Teaching of Reading** (3)
Introduction to methods, techniques, materials, and activities essential to a good elementary school reading program. Prerequisite: Educ 108 and 123, or teaching experience.

123 **Society and the School** (3)
Lecture (2 hours), conference (1 hour), field work (2 hours). Historical and social development of education at local, national, and international levels; cooperation of the school with other community agencies; functions of school personnel.

* War College Program only.
† This course may not be taken by students who have completed or plan to enroll in Educ 111

*128 **Children's Literature** (3)

Lecture (2 hours), field work (2 hours). Newer books for children and the children's classics, contribution of literature to child development, children's original expressions.

205–6 **The Curriculum** (3–3)

For experienced teachers. Educ 205: curriculum foundations and issues, comparison of curriculum patterns. Educ 206: curriculum development in subject areas, group consideration of student problems.

207 **Curriculum Materials** (3 to 6)

For experienced teachers. Construction of courses of study and classroom teaching aids, with direct application to students' situations.

208 **Human Development** (3)

Contribution of various disciplines to an understanding of human development throughout the life span; emphasis on practical implications of relevant research.

209 **Child Development** (3)

Interdisciplinary approach to child development. Analysis, interpretation, and practical implications for instruction of research in disciplines contributing to a knowledge of child development.

210 **Adolescent Development** (3)

Interdisciplinary approach to adolescent growth and development. Analysis, interpretation, and practical implications for instruction of research in disciplines contributing to a knowledge of the adolescent.

212 **Educational Measurement** (3)

Basic measurement techniques; construction, selection, administration, and interpretation of objective and essay-type examinations; statistical analysis of test results; laboratory use of test instruments.

213–14 **History of Education** (3–3)

Educ 213: European backgrounds of American education. Educ 214: evolution of the American school system.

216 **Education of Slow-learning Children** (3)

Identification, nature, and needs of slow-learning elementary and junior high school children. Emphasis on diagnosis and treatment of learning difficulties.

217–18 **Philosophy of Education** (3–3)

Educ 217: to help students formulate a personal philosophy of education. Educ 218: social foundations of education—forces that shape policies and offerings of the school.

219 **Elementary School Classroom Procedures** (3)

Current classroom practices; emphasis on planning, unit teaching, techniques in discipline; individual and group evaluation techniques, resources for learning, providing for individual differences.

* This course may not be taken by students who have completed or plan to enroll in Educ 111.

223 **Foundations of Reading Instruction** (3)
(Formerly Reading Problems)
Historical and psychological background; evaluation of recent methods, materials, and techniques in teaching reading; demonstrations of diagnostic and teaching techniques.

224 **Reading Problems** (3)
Elementary school reading difficulties; classroom and clinical techniques in testing and teaching. Prerequisite: one or more years of recent teaching experience and a previous course in reading or language arts.

226 **Reading in Secondary School and College** (3)
Methods, techniques, and materials necessary for developing efficient reading skills, including skills in content subjects; organizing and evaluating reading programs.

227 **Basic Issues in Elementary Education** (3)
Identification, definition, and analysis of some of the most important problems facing the contemporary American elementary school.

228 **Instructional Areas in Elementary Education** (3)
Objectives, organization, content, and teaching methods in language arts, arithmetic, social studies, science, arts and crafts, health and physical education.

229 **Administration of Elementary Education** (3)
For experienced teachers and administrators. Achieving instructional objectives, organizing and servicing teaching activities, coordinating school and community life.

231 **Secondary School Classroom Procedures** (3)
Current classroom practices: teacher-pupil planning, group procedures, initiatory and culminating activities, individual and group evaluation techniques, teaching aids, etc.; review of recent literature.

232 **Supervision of Elementary Education** (3)
For experienced teachers and administrators with two or more years of teaching experience. Review of modern supervisory concepts including practices in the operation of the elementary school.

233 **Audio-visual Education** (3)
Lecture (2 hours), laboratory (1 hour). Selection, evaluation, and use of audio-visual materials; administrative problems in care, operation, maintenance, and use of such materials and equipment. Material fee, $7.

241 **Education of the Gifted** (3)
For classroom teachers. Nature and discovery of giftedness, provisions for the gifted in regular classes, experimental projects.

243 **Human Relations in Education** (3)
Principles and practices in human relations between and among learner, teacher, other school personnel, and parents.

245 **School and Community** (3)
The school as an important member of a team of social agencies that builds the community.

247 **Adult Occupational Education** (3)
(Formerly Vocational Education)

Development, current concepts, agencies involved, problems, and trends in adult vocational-technical-occupational education in the United States and foreign countries.

251 **Foundations of Guidance and Personnel Services** (3)

Introductory survey: definitions, scope, principles, historical background, organization, services, emerging trends, and issues.

252 **Organization and Administration of Guidance Services** (3)

For guidance directors, supervisors, and experienced school counselors who hope to qualify for such positions. Prerequisite: a minimum of 15 semester hours of approved graduate work in measurement and guidance.

253 **Analysis of the Individual for Purposes of Counseling** (3)

Detailed study of individual analysis and appraisal techniques. Development of systematic case study. Prerequisite: Educ 112 or equivalent.

254 **The Middle School** (3)

Purposes, organization, core program, guidance, developing course of study, extra-classroom activities.

255–56 **Secondary Education** (3–3)

Educ 255: current proposals for improvement of secondary education. Educ 256: current problems in each subject-matter field.

257 **Educational and Occupational Development** (3)

Theories of career development; structure of education, training, and work in the United States; sources, forms, collection, evaluation, and dissemination of educational-occupational information.

259 **Secondary School Administration** (3)

For experienced teachers and administrators with two years of secondary school teaching. Survey of administration including practices of the modern high school.

260 **Secondary School Supervision** (3)

For experienced teachers and administrators with two or more years of teaching experience. Review of modern supervisory concepts, including practices followed in the operation of the school.

263 **Human Resource Development: Training and Education** (3)

Concepts and purpose, historical backgrounds, emerging roles of human resource development personnel, program areas. Prerequisite: adequate professional preparation or two years of experience in training, education, and development.

264 **Program Planning in Human Resource Development** (3)

Training, education, and development programs for various client systems will be planned using the critical events technique conceptual model. Field work including implementation of programs for actual client system. Prerequisite: Educ 263 and permission of instructor.

271 **The Teacher and School Administration** (3)

Role of federal, state, and local administrative units; school finance; legal controls; school plant; public support; improving teaching conditions.

272 **The Teacher and School Supervision** (3)
Nature, organization, human relationships, and techniques.

275 **Seminar: School Finance** (3)
Educational financial theory, practice, and control, including methods of financing.

276 **Seminar: Public Relations in School Administration** (3)
Purposes, gathering materials, disseminating agencies, publicity media, public participation in policy-making.

278 **School Law** (3)
Sources and scope of school law; legal rights and responsibilities of teachers, pupils, and taxpayers. Other legal problems of major interest to the group.

279 **Adult Education** (3)
Current concepts and objectives, historical development, agencies involved, field personnel, clients, programs on all levels—community through international.

280 **Program Planning in Adult Education** (3)
(Formerly Adult Education)
Determining educational needs for adults at all levels in school and non-school agencies; planning programs and instruction; budgeting and scheduling of adult programs. Adult advisory committees, community surveys. Field work with actual sponsoring agency. Prerequisite: Educ 279 and permission of instructor.

283 **Higher Education in the United States** (3)
Development, scope, purposes, present status, programs, and trends in higher education in the United States.

284 **Administration of Higher Education** (3)
Government, organization, and administration of colleges and universities.

285 **Student Activities** (3)
Nature and purposes of selected activities—homeroom, clubs, assemblies, school publications, student council, interscholastic contest; attention to sponsorship, participation, finance, and evaluation.

291 **Planning the School Plant** (3)
Selection of sites; evaluation of existing buildings; utilization of present facilities; adaptation to curricular needs; building, operation, and maintenance problems.

295 **Research Methods and Procedures** (3)
Required of all candidates for graduate degrees in Education. To be taken early in the graduate program. Prerequisite: Educ 112 or equivalent.

297 **Personnel Administration** (3)
Organization and administration of personnel programs for educational institutions. Basic philosophy, principles, responsibilities, and functions.

298 **Seminar: Personnel Administration** (3)
Research: policies, rules and regulations, staff organizations, negotiations

299–300 **Thesis Research** (3–3)

301 **Data Processing in Education** (3)

Machine accounting and computer technology for counselors, teachers, and administrators.

316 **Curriculum Developments in Elementary School Social Studies** (3 to 6)

For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective elementary school social studies curriculum. Admission by permission of instructor.

317 **Curriculum Developments in Elementary School Science** (3 to 6)

For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective elementary school science curriculum. Admission by permission of instructor.

320 **Curriculum Developments in Elementary School Mathematics** (3 to 6)

For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective elementary school mathematics curriculum. Admission by permission of instructor.

354 **Counseling of Minority Groups** (3)

Consideration of problems and approaches related to counseling cultural and racial minorities in American society; emphasis on counseling the disadvantaged in urban areas.

355 **Counseling in Groups** (3)

For experienced counselors and psychologists. Peer-group relationships with emphasis on adolescent groups. Principles of group dynamics as related to interaction within groups. Techniques and practice in group counseling.

357 **Mental Hygiene** (3)

Mental health problems; emphasis on needs of counselors, teachers, and others working with children and adolescents.

371 **Principles and Methods of College Teaching** (3)

General principles, methods, techniques, and experimental instructional media for teaching at the college and university level.

372 **Internship in College Teaching** (3 to 6)

Supervised experience in a selected area of college teaching. Prerequisite: Educ 371. Admission by permission of instructor.

373 **The Junior-Community College** (3)

Development, organization, curriculum, role, issues, and problems of the junior-community college.

374 **Current Issues in Higher Education** (3)

Investigation of current issues in higher education. Fall semester open to students not majoring in higher education; spring semester open only to students majoring in higher education. Prerequisite: Educ 283, 284.

380 **Sensitivity Training: Laboratory Method** (3)

A sensitivity learning experience in human relations using unstructured group experience, individual feedback, experimentation, and practice. Admission by permission of instructor.

381 **The Adult as a Learner** (3)

Psychology of learning as applied to adults; effect of age on learning; physical and social environment in adult education situations.

382 **Methods in Adult Education** (3)

Methods, techniques, and devices in adult education; traditional methods, developing action-oriented learning situations, programmed instruction, and systems approach in developing training materials.

383 **Counseling of Adults** (3)

Theories and practical applications of occupational counseling, emphasizing distinct needs of adults and young adults; primarily intended for counselors in military, government, business, and industrial organizations.

384 **Evaluation of Adult Education** (3)

Measurement and evaluation of adult education in school and nonschool agencies—business, industry, government, voluntary, and community.

386 **Current Issues in Adult Education** (3)

Investigation of current issues in adult education.

391 **College and University Curriculum** (3)

Development, patterns, creative design, issues, problems, evaluation, and trends in the higher education curriculum.

392 **Financing Higher Education** (3)

Analysis of private, state, and federal revenue sources; student income, budgets, computation of unit costs, means of supporting legislative and federal requests, and measurement of economic returns.

394 **Administration and Governance in Higher Education** (3)

Organization and administrative structures and patterns in higher education. Prerequisite: Educ 284.

English

Chairman: G.E. McCandlish, Professor of English; Stuart 407, Telephone 676-6180

Before students are registered in Engl 1, they are tested in the minimum essentials of vocabulary, spelling, grammar, standard usage, and writing skill. Those students who show marked superiority may, upon passing further tests, be exempted from one or both halves of the English Composition course; those who are inadequately prepared for Engl 1 will be assigned to *Basic English*. In lieu of *Basic English*, off-campus students may, if they desire, be given permission to register for Engl 1x on campus. **Engl 1 or 1x is prerequisite to all other courses in English.**

ENGLISH COMPOSITION

X **Basic English** (0)

Instruction, drill, and exercises in grammar, vocabulary, spelling, and mechanics in general; instruction and exercises in composition and reading. This course is designed to prepare students for Engl 1. No academic credit. Tuition fee, $108.

1 **English Composition** (3)

Analysis and practice of expository techniques with emphasis on unity, development, organization, and coherence; library research procedure.

1*x* **English Composition** (3) (Campus Course)

Intensive course in English grammar and composition for students inadequately prepared for Engl 1. Begins with detailed instruction, drill, and exercises in basic structure of the English language and in writing paragraphs; continues with content of Engl 1. Engl 1*x* meets five hours a week and carries 3 semester hours of credit. Total fee, $247 (tuition fee of $222 plus additional fee of $25).

2 **English Composition** (3)

Readings and practice in expository and argumentative techniques; research practice. Prerequisite: Engl 1 or 1*x*.

11 **The Writing of Reports** (3)

Theory and practice in the writing of technical reports. Prerequisite: Engl 1 or 1*x* and 2.

WORLD LITERATURE

41–42 **Introduction to World Literature** (3–3)

Engl 41: a survey of Western literary heritage from Homer to Milton. Engl 42: a review of Western literature from the English metaphysical poets to the present.

ENGLISH LITERATURE

51–52 **Introduction to English Literature** (3–3)

Historical survey. Prerequisite: Engl 1 or 1*x*.

91–92 **Introduction to European Literature** (3–3)

Consideration of various types. Prerequisite: Engl 1 or 1*x*.

AMERICAN LITERATURE

71–72 **Introduction to American Literature** (3–3)

Historical survey. Engl 71: from the beginnings to the Civil War. Engl 72: from the Civil War to present. Prerequisite: Engl 1 or 1*x*.

Epidemiology and Environmental Health

Chairman: J.W. Millar, Vivian Gill Professor of Epidemiology and Environmental Health; School of Medicine, Telephone 331-6117

1 **Principles of Environmental Health I** (2)
Communicable disease: recognition, mode of spread, general methods of control, immunization, quarantine, disinfectants, and insecticides.

2 **Principles of Environmental Health II** (2)
Water, its relationship to man's well-being. Disposal of human wastes—excreta and refuse; atmospheric pollution.

3 **Principles of Environmental Health III** (2)
Food, housing (urban and rural), institutional sanitation, radiological sanitation, insect vector, and rodent control.

101 **Environmental Sanitary Science I** (2)
Water: general characteristics (urban and rural), treatment and distribution; public bathing place sanitation; design and function of water treatment facilities.

102 **Environmental Sanitary Science II** (2)
Recognition and control of environmental pollution. Treatment and disposal of human wastes—excreta, refuse, and air.

103 **Environmental Sanitary Science III** (2)
Dairy products and food sanitation; processing, storage, and distribution of food. Supervision and training of personnel involved with food and the food industry.

104 **Environmental Sanitary Science IV** (2)
Housing, urban and institutional; heating, ventilation, lighting, and noise. Study of federal and municipal regulatory aspects.

105 **Air Pollution Abatement** (2)
Association of air pollution and disease and the effects of major pollutants on man. Air measurement and air measurement techniques demonstrated.

121 **Environmental Biostatistics** (2)
Statistical reasoning, collection of data, rates, incidence, and prevalence. Generalization of observations and use of measurement data.

122 **Environmental Epidemiology I** (2)
Infectious diseases: bacterial, viral, rickettsial, protozoal, and helminthic.

123 **Environmental Epidemiology II** (2)
Zoonoses, deficiency diseases, chronic disease, pneumoconiosis, mental health, maternal and child health.

131 **Environmental Epidemiology III** (1)
Venereal disease: etiology, clinical manifestation's diagnosis; prevention and control of syphilis, gonorrhea, chancroid, granuloma inquinale, and LGV.

141 **Public Health Entomology I** (2)

How the arthropods affect man. Study of host-parasite vector relationships; principles of systematic biology and basic insect taxonomy and toxicology.

142 **Public Health Entomology II** (2)

Identification, life cycles, and bionomics of medically important insects and other arthropods.

143 **Public Health Entomology III** (1)

Study of chemical, biological, and mechanical control of all medically important arthropods.

144 **Public Health Entomology IV** (1)

Prevention and control of rodent infestation; identification, habits, and relationship to man.

151 **Public Health Microbiology I** (3)

Medical parasitology, protozoology (intestinal), the Haemosporidia (malaria), the Haemoflagellates and the metoza (helminths) of medical importance.

152 **Public Health Microbiology II** (2)

Clinical bacteriology, characteristics and identification of the bacteria involved in disease, study of rickettsia and viruses.

153 **Public Health Microbiology III** (2)

Study and identification of the flora of water, dairy products, food, and the atmosphere.

154 **Public Health Microbiology IV** (1)

Mycology: study of medically important fungi, systematic mycoses and dermatomycoses.

171 **Industrial Hygiene I** (2)

Chemical hazards: study of diseases from chemical exposure, toxic dusts, metal fumes and vapors, gases, and organic compounds.

172 **Industrial Hygiene II** (2)

Physical hazards: biological effects of low and high temperatures, radiation (electromagnetic, ultraviolet, ionizing), illumination, sound, pressure, and atmospheric pollution.

191 **Public Health Administration I** (1)

Activities and organization; philosophy, background, and development. Public health activities include vital statistics, laboratory services, education, nursing, and social services.

192 **Public Health Administration II** (1)

Administrative considerations, including governmental aspects, legal considerations, fiscal management, personnel factors, and public relations in public health organizations.

231 **Veneral Disease in the Community** (3)

A survey course to develop an understanding of venereal disease problems.

Etiology, clinical manifestations, diagnosis, prevention, and control. For parents, school teachers, health personnel, and other educators.

293 **Public Health Administration** (3)

Principles and practices: ecology approach in planning community health services; interplay of social, cultural, political, and economic factors. Open to qualified undergraduates with permission of instructor.

French*

Chairman: J.F. Burks, Professor of French; A-11, Telephone: 676-6330

Placement Examination: A standardized placement examination given before registration is required of all entering students who wish to continue in college the language begun in high school. Upon completion of the examination, assignment is made to the appropriate course, with credit assigned on the usual basis.

1–2 **First-year French** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Fren 2. For beginners. Pronunciation, conversation, grammar, composition, reading of modern French prose. Aural training, oral practice in language laboratory. Laboratory fee, $17.50 a semester.

3–4 **Second-year French** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Fren 4. Conversation, grammar, composition, reading in modern French prose, introduction to French civilization. Aural training, oral practice in language laboratory. Prerequisite: Fren 1–2, or two years of high school French. Laboratory fee, $17.50 a semester.

Geodesy†

Program Adviser: Hyman Orlin, Professorial Lecturer in Geodetic and Cartographic Science; Telephone: 946-3557

12 **Plane Surveying** (3)

Theory and practice in measurement of distances, angles, and elevations; traversing, leveling, and triangulation; stadia surveying, plane coordinate computations, and miscellaneous surveying problems. Prerequisite: Math 6 or equivalent.

13 **Geodetic Surveying** (3)

Elements of geodetic and hydrographic surveys; electronic measurements; triangulation, trilateration, and precise traverses; geodetic leveling and precise trigonometric leveling; introduction to geodetic astronomy and to least squares adjustment. Prerequisite: Geod 12 or permission of instructor.

* Administered by the Department of Romance Languages and Literatures.
† Affiliated with the Department of Geography and Regional Science

17 **Elementary Photogrammetry** (3)

Fundamentals of aerial photography, photogrammetric optics, and photographic processes; mathematics of vertical and tilted photographs; stereoscopy and parallax; planning and executing the photogrammetric project; radial triangulation methods; photomaps; oblique and terrestrial photography. Prerequisite: Cart 2, Geod 12; or permission of instructor.

18 **Intermediate Photogrammetry** (3)

Basic photogrammetry theory and practice. Stereoscopic plotting instruments; graphical and computational methods for adjusting strips of aerotriangulation; electronic computers. Method of least squares applied to photogrammetry. Prerequisite: Geod 17.

110 **Map Projections** (3)

Mathematics of projections; geometry of sphere and ellipsoid; distortions; conic, cylindrical, and azimuthal projections; geodetic projections. Prerequisite: Math 32.

117 **Advanced Photogrammetry** (3)

Analytic photogrammetry. Prerequisite: Geod 18, Math 33.

155 **Elementary Geodesy** (3)

Principles and formulas basic to theoretical and applied geodesy, with application to special problems; computations on an ellipsoid, gravimetry, deflection of the vertical and Laplace's equation, introduction to satellite geodesy. Prerequisite: Geod 13, Math 32; or permission of instructor.

156 **Geodetic Astronomy** (3)

Principles and formulas for the astronomic determination of longitude, time, azimuth, and latitude; star catalogues; observing and time-recording instruments; practice in observing and computation. Prerequisite: Geod 13, Math 32; or permission of instructor.

160 **Mathematics of Adjustments and Least Squares** (3)

Types and distribution of errors, Gaussian and Poisson distributions, fundamentals of matrix algebra with special emphasis on least squares adjustment. Prerequisite: Geod 155, Math 33.

161 **Adjustments in Geodesy and Photogrammetry** (3)

Adjustment theory and special adjustment problems. Prerequisite: Geod 160.

eography and Regional Science

airman: Marvin Gordon, Associate Professor of Geography and Regional Science: 200. Telephone: 676-6185

51 **Introduction to Geography** (3)

General survey of the various systematic, physical, and human fields of geography which play a role in the analysis and interpretation of man-environment relationships in both spatial and ecological contexts.

52 **World Regional Patterns** (3)
Emphasis on spatial aspects of man's activities within a world regional framework.

105 **Weather and Climate** (3)
Climatic elements and their controls, analysis of world climatic patterns.

125 **Transportation Geography** (3)
Problems of interaction, diffusion, and information transfer as they appear in a spatial context. Consideration of nodal activity, nodal and route hierarchies, nature of networks, gravity and interaction models, diffusion process, network geometry.

126 **Economic Geography** (3)
(Formerly World Economic Geography)
Development, elaboration, and testing of theories and hypotheses concerning the location of economic activities: services, manufacturing industries, and agricultural production. Introduction to restatements of classical location theory and new approaches in the empirical analysis of the location of economic activities. Problem-solving exercises, using the University Computer Center's canned programs.

127 **World Population and Settlement** (3)
Patterns of world population; factors contributing to population pressures, growth, and migrations.

141 **Urban Settlement** (3)
Consideration of city sizes; functions and locations within a system of cities; emphasis on the physical and functional internal structure of the city, including residential, commercial, and industrial patterns. Analysis of the changing nature of cities and resulting urban problems.

146 **World Political Geography** (3)
Analysis of the interrelationships between the political community and the human and physical environment.

148 **Principles of Geography** (3)
Study of geographic principles, technology and tools designed to meet specific needs of teachers. Emphasis on the practical application of geographic concepts and the use of source materials in the classroom.

149 **Principles of Photographic Interpretation** (3)
Fundamentals of aerial photographic interpretation, survey of the applications of imagery application, introduction to nonoptical image-forming systems.

152 **Eastern Europe** (3)

161 **Latin America** (3)
A study of the relationships among the areal distribution of population, economic activity, and physical endowment in Latin America.

168 **Arctic Regions** (3)
Human and physical aspects of the Arctic regions with respect to natural environment and potential resources, present state of development and

special problems encountered. Given in cooperation with the Arctic Institute of North America.

224 **Seminar: Political Geography** (3)

Study of the spatial relationships between the political community and environment.

Geology

Chairman: Geza Teleki, Professor of Geology; Bell 3, Telephone: 676-6190

1–2 **Introductory Geology** (3–3) (Campus Course)

Lecture (2 hours), laboratory (2 hours), optional field trips. Survey covering the principles of geology. Laboratory fee, $12 a semester.

3 **Introductory Geology** (3)

Survey covering the principles of geology. Nonlaboratory course for off-campus students only.

4 **Introductory Geology** (3)

Geological periods, evolution of life on earth. Nonlaboratory course for off-campus students only. Prerequisite: Geol 1 or 3, or permission of instructor.

125 **Marine Geology** (3)

Lecture and map work. Principles of oceanography and submarine geology; geology of the deep sea; topography, crustal structure, sedimentary processes, and marine environment. Prerequisite: Geol 1–2.

141 **Introductory Geochemistry** (3) (Campus Course)

Lecture (2 hours), laboratory as arranged. Principles and theories on the abundance, relationships, and distribution of the elements in various rock and mineral species. Prerequisite or concurrent registration: Geol 117 or equivalent; Chem 11–12; Math 30; Phys 1, 2. Laboratory fee, $12.

Geophysics*

Program Adviser: Hyman Orlin, Professorial Lecturer in Geodetic and Cartographic Science; Telephone: 946-3557

105 **Elementary Geophysics** (3)

Introduction to geophysics; origin of the earth, geochronology, seismology, gravity, and geomagnetism. Prerequisite: Geol 1 or 3, Math 32.

106 **Interpretation Theory—Geophysics** (3)

Development of mathematical and physical foundations for interpreting seismic, gravimetric, and magnetic data. Prerequisite: Geop 105.

* Affiliated with the Department of Geography and Regional Science.

115 **Elementary Seismology** (3)

Principles of seismographs; analysis of stress and strain, interpretation of earthquake seismograms, location of earthquakes; seismic waves in the earth and the structure of the earth's interior as deduced from geophysical data, earthquake magnitude energy and intensity, seismic risk and the effects of earthquakes, review of earthquake activity throughout the world. **Prerequisite: Geop 105.**

Germanic Languages and Literatures

Chairman: Carl Steiner, Associate Professor of German; Rice 408, Telephone 676-6195

Placement Examination: A standardized placement examination given before registration is required of all entering students who wish to continue in college the language begun in high school. Upon completion of the examination, assignment is made to the appropriate course, with credit assigned on the usual basis.

1–2 **First-year German** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Germ 2. Essentials of German grammar; translation of easy prose. Three classroom periods a week plus one period of aural-oral practice in language laboratory. Laboratory fee, $17.50 a semester.

3–4 **Second-year German** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Germ 4. Selections from modern German prose; continuation and review of grammar. Three classroom periods a week plus one period of aural-oral practice in language laboratory. Prerequisite: Germ 1–2 or two years of high school German. Laboratory fee, $17.50 a semester.

Health Care Administration

Chairman: Leon Gintzig, Professor of Hospital Administration; CC-11, Telephone: 676-6220

153–54 **Survey of Health Care Organization and Procedures** (3–3)

Introduction to the history, concepts, and activities of health care systems in this country. Emphasis on organization and procedures used in various types of health care facilities. Not open to Master's degree candidates in Health Care Administration.

202 **Introduction to Health Care Administration** (3)

Lecture and discussion (2 hours), laboratory (2 hours). Survey of state, national, and community health services; includes medical terminology, communicable diseases, environmental sanitation, and biostatistics.

203 **Health Care Organization and Management** (3)

Lecture and discussion (2 hours), laboratory (2 hours). History and current character of institutional health care. Organizational functions and structure of various kinds of facilities related to health care administration. **Prerequisite or concurrent registration: Mgt 201.**

205 **Hospital Management Procedures** (3)

Lecture and discussion (2 hours), laboratory (2 hours). Departmental administration. Survey of hospital law; hospital forms, procedures, and systems; and hospital programs pertaining to disaster relief, safety, fire prevention.

209 **Health Care Economics and Financial Management** (3)

Lecture (2 hours), laboratory (2 hours). Economic and financial analysis of the interactions between consumers of health care, providers of health care, and public and private prepayment and insurance programs. Industry price structure and the long- and short-term capital requirements of health care institutions.

250 **Mental Health Facilities and Resources: Functional Services, Organization, Administration, and Management** (3)
(Formerly Administration for Mental Care)

Special characteristics of administration and management of mental health facilities—public and private mental hospitals, psychiatric units and services in general hospitals, community mental health centers, out-patient psychiatric clinics, and institutions for mental retardation.

Hebrew*

Chairman: J.E. Ziolkowski, Assistant Professor of Classics: T-23, Telephone: 676-6125

Placement Examination: A standardized placement examination given before registration is required of all entering students who wish to continue in college the language begun in high school. Upon completion of the examination, assignment is made to the appropriate course, with credit assigned on the usual basis.

21–22 **First-year Hebrew** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Clas 22. Study of the elements of Hebrew; emphasis on sources of the language, reading comprehension, writing facility, and conversation.

23–24 **Second-year Hebrew** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Clas 24. Review of grammar; continued development of reading comprehension, writing facility, and conversation. Selections from Hebrew text of the Old Testament and other materials.

History

Chairman: C.J. Herber, Associate Professor of European History; Stuart 419, Telephone: 676-6230

Departmental prerequisite: Hist 39–40 or 91–92 is prerequisite to courses 108 through 158 and 187 through 196; Hist 71–72, to courses 167 through 185; either Hist 39–40, 71–72, or 91–92, to courses 162 through 166. Prerequisite to Hist 105–6 either Hist 39–40, 91–92, or a background in a science. Students may waive one or more of the prerequisite courses by passing a departmental waiver examination.

*Administered by the Department of Classics.

by attaining scores of 600 or above on the College Entrance Examination Board Achievement tests, or by good performance on Advanced Placement Examinations.

39–40 **European Civilization in Its World Context** (3–3)
Primarily for freshmen. Hist 39: political, social, economic, and cultural history from ancient times to early modern era. Hist 40: from early modern era to present. Students who receive credit for Hist 39–40 cannot receive credit for Hist 91–92.

71–72 **Introduction to American History** (3–3)
Primarily for sophomores. Hist 71: political, social, economic, and cultural forces of the United States in their world setting from 1492 to 1861. Hist 72: from 1861 to present.

91–92 **World Civilizations** (3–3)
Hist 91: major civilizations of the world to 1500. Hist 92: Europocentric and world civilization since 1500. Student who receive credit for Hist 91–92 cannot receive credit for Hist 39–40.

145–46 **History of Russia** (3–3)
Rise and revolution of Russia. Hist 145: the Old Regime, 800–1900. Hist 146: Revolution and Soviet rule since 1900.

149–50 **European Diplomatic History** (3–3)
The European state system; diplomatic practices and relations since the Congress of Vienna; emphasis on policies and actions of the great powers and their statesmen. Hist 149: to 1890. Hist 150: since 1890. Students who receive credit for Hist 150 cannot receive credit for Hist 157.

163–64 **History of Latin America** (3–3)
Political, social, and cultural development. Hist 163: through independence. Hist 164: the national period.

*179–80 **U.S. Economic History** (3–3)
Process of economic growth from Colonial times to the present. Development of various sectors in the economy—such as agriculture, transportation, manufacturing, and banking—and their interdependence. Hist 179: 1607–1865. Hist 180: 1865 to present.

181–82 **U.S. Diplomatic History** (3–3)
Tendencies toward isolation, expansion, and collectivism; disputes with foreign countries and their settlement; activities of American secretaries of state and diplomatic agents. Hist 181: to 1898. Hist 182: since 1898.

195–96 **History of East Asia** (3–3)
Civilizations of China and Japan; emphasis on cultural development and social organization. Hist 195: beginnings to about 1800. Hist 196: traditional societies on the eve of the modern era, their responses to Western cultural influences since the mid-19th century.

201 **History and Historians** (3)
Students who receive credit for Hist 201 cannot receive credit for Hist 199.

245–46 **Research Seminar: Russian History** (3–3)
Prerequisite: Hist 145–46 or equivalent.

* Interdepartmental course offered by departments of History and Economics

281–82 **Research Seminar: U.S. Diplomatic History** (3–3)
Prerequisite: Hist 181–82 or equivalent.

Humanities

Faculty Adviser: J.H. Coberly, Professor of English; Stuart 405, Telephone: 676-6630

1–2 **Humanities in the Modern World** (3–3)

Interdisciplinary study of modern Western thought from the Renaissance to the 20th century. Reading and intensive class discussion of five works each semester from the following authors: Machiavelli, Pope, Voltaire, Rousseau, Goethe, Tolstoy, J.S. Mill, Zola, Nietzsche, Kierkegaard, Freud, Kafka, Koestler, T.S. Eliot. Background lectures on the major intellectual, artistic, economic, and social movements.

3–4 **Classical Humanities** (3–3)

Interdisciplinary study of the thought of Greece and Rome. Reading and intensive class discussions of five works each semester from the following authors: Homer, Hesiod, Aristophanes, Plato, Aristotle, Aeschylus, Euripides, Sophocles, Herodotus, Thucydides, Lucretius, Marcus Aurelius, Epictetus, Polybius, St. Augustine. Background lectures on the major intellectual, artistic, economic, and social movements.

International Affairs*

Faculty Adviser: B.M. Sapin, Professor of International Affairs and Political Science; Building LL, 2nd floor, Telephone: 676-6240

The following courses are offered only in the War Colleges' curricula:

250 **International Relations of Latin America** (3)

256 **Diplomacy between the World Wars** (3)

257 **Seminar: Diplomatic History of World War II** (3)

259 **Seminar: International Relations of Western Europe** (3)

260 **Fundamentals of National Power** (3)

261 **International and U.S. Foreign Policy** (3)

262 **National Security Policy of the United States** (3)

263 **Intercultural Relations** (3)

265 **Seminar: Diplomacy, Strategy, and Arms Control** (3)

267 **Seminar: Domestic Bases of Foreign Policy Formulation** (3)

*Administered by the School of Public and International Affairs

270 **Current Economic Problems** (3)

287 **Power Politics in the Pacific** (3)

288 **Seminar: the United States and the Caribbean** (3)

289 **Seminar: Modern China** (3)

297 **Readings in International Affairs** (1, 2, or 3)

299–300 **Thesis Research** (3–3)

Italian*

Chairman: J.F. Burks, Professor of French; A-11, Telephone: 676-6330

Placement Examination: A standardized placement examination given before registration is required of all entering students who wish to continue in college the language begun in high school. Upon completion of the examination, assignment is made to the appropriate course, with credit assigned on the usual basis.

1–2 **First-year Italian** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Ital 2. For beginners. Pronunciation, conversation, grammar, composition, reading of modern Italian prose. Aural training, oral practice in language laboratory. Laboratory fee, $17.50 a semester.

3–4 **Second-year Italian** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Ital 4. Conversation, grammar, composition, reading in modern Italian prose, introduction to Italian civilization. Aural training, oral practice in language laboratory. Prerequisite: Ital 1–2 or two years of high school Italian. Laboratory fee, $17.50 a semester.

Latin American Civilization—Special Program

Program Director: R.C. Burns; Building LL, Telephone: 676-7049
Faculty Consultants: C.E. Galbreath, Professor of International Economics; Marvin Gordon, Associate Professor of Geography and Regional Science; J.W. Robb, Professor of Romance Languages; Mario Rodríguez, Professor of Latin American History; K.L. Storrs, Instructor in Political Science; H.M. Stout, Professor of International Affairs and Political Science

101 **Latin American Civilization** (3)

A three-week, University-conducted study program in a selected area in Latin America, effecting a broad synthesis of history, politics, economy, geography, language, and literature in order to achieve an understanding of contemporary problems and assess national attitudes in the light of world relations. On-the-spot seminars, guest lectures at universities, instructional visits to government offices, first-hand observation of each country and the operation of its economy, comparisons and contrasts among the countries of the area. May be repeated for credit.

* Administered by the Department of Romance Languages and Literatures

Management Science

Chairman: R.L. Holland, Associate Professor of Management Science; Government 201, Telephone: 676-7375

118 **Introduction to Data Processing** (3)
(Formerly B Ad 118)

Basic data processing principles and methods. A management-oriented introduction to the fundamentals, potentials, and problems of computer-based data processing as a tool for record-keeping, resource-controlling, and decision-making.

119 **Data Processing Programming** (3)
(Formerly B Ad 119)

Basic principles and methods of computer programming. General methods of problem-solving illustrated through analysis, flow charting, and programming of business-oriented data processing problems. Students write programs in FORTRAN and COBOL using the University's IBM 360 computer. Prerequisite: Mgt 118.

120 **Data Processing Systems** (3)
(Formerly B Ad 120)

Assessment of the systems concept and its relationship to management, organization, data, and information. Principles and techniques of analysis, design, and implementation of computer-based data and information systems; management of systems planning resources.

201 **Advanced Administrative Management** (3)

Advanced course in administration emphasizing principles and practices common to administrative units of all kinds.

203 **Mathematics for Management** (3)

Mathematical concepts employed in the solution of management problems. Applications of analytical geometry, functions, elements of calculus, and linear algebra to optimization problems. Prerequisite: algebra.

204 **Quantitative Factors in Administration** (3)

Survey of quantitative techniques used in the solution of management problems. Potentials and limitations of mathematical models and proper areas for their application. Topics include probability, statistical decision theory, linear programming, waiting line, inventory replacement models.

207 **Human Behavior in Organizations** (3)

Individual, group, intergroup, and other human behavior and development; application of social science research to administration. Practical applications emphasized.

218 **Survey of Data Processing** (3)

A management-oriented presentation of the vocabulary, concepts, and trends in computer hardware and software, information systems design and development, organizational impact, and effective management; milestones of past and current research; computer technology as a rapidly evolving force of major significance in business, government, and industry. Designed to provide comprehension of information technology necessary for contribution to an organizational data processing effort or as

preparation for more advanced study. Prerequisite: Mgt 201, 204, 207; or permission of instructor.

219 **Digital Computer Programming Concepts** (3)

Programming concepts, techniques, and practices as applied to third generation computers. Fundamentals of higher-level languages, flow charting, FORTRAN, COBOL, operating systems, and utility programs. Student programs are run on the University Computer Center's IBM 360 computer. This course will provide the student with an understanding of the role of computer programming in management information systems and management research. Prerequisite: Mgt 218 or permission of instructor.

220 **Comparative Digital Computer Systems and Their Management** (3)

Characteristics and capacities of the range of data processing equipment in use today, special purpose equipment in business and government, recent and prospective equipment developments, and selection of computers and related equipment. Prerequisite: Mgt 218 or permission of instructor.

221 **Management Information Systems Development and Application** (3)

Development of management information systems, integration of data processing in operations of government or business, impact on management organization and decision-making. Case studies. Prerequisite: Mgt 218 or 219, 224; or permission of instructor.

222 **Seminar: Advanced Digital Computer Concepts** (3)

Current problems in the design and implementation of computer-based systems; emphasis on current state-of-the-art through discussion with leading experts in the field and analysis of literature. Admission by permission of instructor.

223 **Management of a Data Processing Organization** (3)

Advanced course in information technology; emphasis on principles, practices, and trends in the management of data processing. Unique problems, functions, and requirements of data processing management, stressing executive interaction in decision-making, planning, and evaluative functions. Prerequisite: Mgt 218 and either 219 or 220; or permission of instructor.

224 **Theory and Management of Systems** (3)

Advanced course in systems, emphasizing systems theory and the capacities, capibilities, and management of current, large systems. Analysis of components and elements of systems and their association with management concepts. Applications; various techniques and potential problems for implementation. Systems of the future are projected with consideration of quanitative and technological developments. Particular emphasis on computer-based and communications-oriented systems. Prerequisite: Mgt 201, 204.

225 **Introduction to Managerial Statistics** (3)

Introduction to the mathematics of probability and statistics and its applications in management science and operations research. Topics include random variables, discrete and continuous probability distributions; moments and other decriptive measures; sampling theory; and an introduction to statistical estimation, hypothesis testing, and regression analysis. Prerequisite: Mgt 203 or equivalent.

226 **Managerial Statistics** (3)

Management applications of the theory and techniques of mathematical statistics. Topics include maximum likelihood and other methods of estimation, hypothesis testing, descriptive measures of bivariate distributions, regression and correlation, analysis of time series, econometric models and multiple regression, statistical decision theory, and the revision of probabilities in decision-making. Prerequisite: Mgt 225.

227 **Mathematical Programming: Techniques and Applications** (3)

Technical and management considerations of linear and nonlinear programming. Mathematical and computational aspects of linear programming. Formulation of linear programming models. Studies of applications of linear programming. Introduction to theory and application of nonlinear programming. Prerequisite: Mgt 203 or equivalent.

228 **Systems Analysis by Simulation** (3)

Methods of systems analysis via computer simulation. Particular attention to inventory models, although queuing systems and management planning models are also covered. Prerequisite: Mgt 226.

229 **Seminar: Management Science and Operations Research** (3)

Supervised study in depth and advanced projects in management science and operations research. Prerequisite: Mgt 226, 227; or permission of instructor.

230 **Administration of Research and Development** (3)
(Formerly B Ad 229)

Examination of technological, political, and economic factors affecting the R&D environment; operational aspects; management problems in military, governmental, and industrial organizations; project selection, resource allocation, personnel, planning and control, measurement and evaluation.

263 **Organization and Management** (3)

Contemporary management theory; emphasis on application of management concepts in organizational practice. Comparative studies of current organizational designs and management processes. Prerequisite: Mgt 201, 204, 207.

268 **Management Engineering** (3)

Analysis of the techniques for initiation and implementation of management engineering programs; emphasis on organization and methods surveys, including the study of work measurement, work simplification, management audits, and other management improvement programs.

*280–81–82 **Managerial Aspects of National Security** (3 or 4–3 or 4–3)

The application of business management principles to the military aspects of national security; organization and administration of the federal government for national defense; management of national resources (natural, human, energy, economic); budgeting and controllership; determination of requirements; procurement; production; supply management; and communications.

* Available only to students in the Master of Science in Administration program at the Industrial College of the Armed Forces.

295 **Research Methods** (3)

Research techniques, sources of information, array and analysis of data, interpretation and presentation of the findings.

Mathematics

Chairman: T.P.G. Liverman, Professor of Mathematics; Monroe 422, Telephone: 676-6235

No Mathematics courses numbered 1 to 100 are available for college credit if the student's previous training in mathematics meets the prerequisite for a higher numbered course.

Graduate credit may not be given for Mathematics courses numbered from 101 to 200 without the permission of the Chairman of the Department.

3 **College Algebra** (3)

Equivalent to the standard two years of high school algebra with several additional topics. Prerequisite: one year each of high school algebra and high school geometry.

6 **Plane Trigonometry** (3)

Prerequisite: two years of high school algebra and one year of high school geometry, or Math 3 (or concurrent registration therefor).

9 **General Mathematics I** (3)

For students electing Math 9 and 10 as a terminal sequence. Logic, sets, number systems. Prerequisite: two years of high school mathematics.

10 **General Mathematics II** (3)

Mathematical systems, geometry, and introduction to statistics and probability. Prerequisite: Math 9.

30 **Precalculus** (3)

Set theory, inequalities, basic analytic geometry, functions and relations. Polynominal, trigonometric, logarithmic, and exponential functions. Prerequisite: Math 3 and 6; or one and one-half years of high school algebra, one year of high school geometry, and one-half year of high school trigonometry; or equivalent. Prior to registration, new students should take a placement examination in algebra and trigonometry.

31 **Calculus of One Variable** (3)

Differentiation and integration of algebraic and elementary transcendental functions, with simple applications. Prerequisite: Math 30 or equivalent. Math 30 may be waived as a prerequisite requirement by examination on scheduled dates.

32 **Calculus of Several Variables** (3)

Partial derivatives, multiple integrals, infinite series. Prerequisite: Math 31.

33 **Calculus of Vector Functions** (3)

Elementary linear algebra, vectors, and matrices. Vector calculus, implicit function theory. Prerequisite: Math 32.

34 **Introduction to Linear Algebra** (3)

Linear functions, solutions of equations, dimension and rank, determinants, eigenvalues, change of basis. Prerequisite: Math 31 or permission of instructor.

111 **Mathematics for Engineers and Physicists I** (3)

Differential equations, linear and multilinear algebra, Fourier series. Prerequisite: Math 33, 34; or permission of instructor.

112 **Mathematics for Engineers and Physicists II** (3)

Fourier integral, Laplace transform, partial differential equations. Prerequisite: Math 111.

124 **Introduction to Matrix Theory** (3)

Operations on matrices, linear equations, matrix inversion, vector spaces, characteristic roots and vectors, spectral theorem, quadratic forms. Prerequisite: Math 32, 34.

134 **Introduction to Boundary Value Problems** (3)

Prerequisite: Math 111 or 142.

139 **Advanced Calculus I** (3)

Review and extension of elementary one-variable calculus, emphasis on the theoretical foundations; differential calculus of several variables. Prerequisite: Math 33.

140 **Advanced Calculus II** (3)

Differential and integral calculus of several variables; implicit function theorem; differential forms. Prerequisite: Math 139 or equivalent.

153 **Introduction to Numerical Analysis** (3)

Introduction to fundamentals of numerical analysis using modern digital computers. Solution of linear systems and of ordinary differential equations. Interpolation polynomials, iterative solution of nonlinear equations, simple quadrature techniques. Prerequisite: Math 111 or 139, or equivalent.

171 **Vector Analysis** (3)

Music

Chairman: George Steiner, Professor of Music; FF–10, Telephone: 676-6245

3 **Introduction to Musical Understanding** (3)

Introductory history of musical styles, related to listening; elements and materials of music.

4 **Survey of Music Literature** (3)

Introductory study of musical forms, structures, and textures; aural analysis of selected literature.

Oceanography*

Program Adviser: Hyman Orlin, Professorial Lecturer in Geodetic and Cartographic Science; Telephone: 946-3557

11 **Navigation** (3)

Theory of navigation, charts, navigation aids, celestial navigation, shipboard instruments.

101–2 **Elementary Oceanography** (3–3)

Chemical and physical properties and composition of sea water, heat budget, distribution of variables, statics, dynamics, water masses, general circulation of the oceans, underwater sound, propagation of light, submarine topography, sea floor deposits, biological classifications, and marine ecology. Spectrum of ocean waves from capillary through tidal, including internal waves. Observations and reduction; history and interrelationships between marine sciences. Prerequisite to Ocea 102: Geol 1 or 3, or permission of instructor.

110 **Ocean Dynamics** (3)

All aspects of physical oceanography except waves and tides. Subjects of physical and chemical properties of sea water, underwater sound, and propagation of light. Emphasis on hydrodynamic equations, statics and kinematics, currents, heat budget, turbulence, and the general circulation and water masses of oceans. Prerequisite: Math 32, Ocea 101.

111 **Ocean Waves and Tides** (3)

All aspects of waves and tides; survey of tidal theory and analysis. Prerequisite: Math 32, Ocea 101.

112 **Biological Oceanography** (3)

Biological science as related to marine environment. Prerequisite: Ocea 102.

113 **Marine Geophysics** (3)

Principles of geophysical measurements and interpretation, earthquake seismology, sound propagation, seismic refraction, and reflection at sea. Elastic wave propagation considerations in liquid and solid media. Sound transmission with special application to SOFAR channel studies. Selected reflection and refraction studies offshore; geophysical investigations of some selected trenches. Instruments, e.g., Precision Depth Recorder (PDR), etc. A description of the specialties in the discipline of earthquake seismology and their application in furthering knowledge of the earth's interior. Prerequisite: Geop 105, Phys 1.

114 **Chemical Oceanography** (3)

Chemical processes in the marine environment, including composition of sea water, nutrients, natural composition, and variation, carbonate cycle, geochemistry, and extraction. Prerequisite: Chem 12, Ocea 101; or permission of instructor.

115 **Geological Oceanography** (3)

Physiography of the sea floor and geological processes of the ocean basins and margins, properties and distribution of sediments and rates of deposi-

* Affiliated with the Department of Geography and Regional Science.

tion; distribution of minerals, structure and origin of the ocean basins. Prerequisite: Ocea 102.

Pharmacology

Chairman: H.G. Mandel, Professor of Pharmacology; School of Medicine, Telephone: 331-6541

110 **Pharmacology of Anesthesia** (3)

Limited to students in the Nurse Anesthetists Program. Lectures and conferences concerning the physiological and pharmacological principles of clinical anesthesia on the theoretical basis for the use of pharmacological agents.

115 **Drug Abuse Education** (3)

The psychological and sociological bases of drug abuse, pharmacological and toxicological aspects of drug action on both the brain and peripheral organ systems, legal and societal implications of and reactions to drug abuse. Lectures and discussions on alcohol, narcotics, central nervous system stimulants and depressants, marijuana and other hallucinogenic and psychedelic drugs.

215 **Adolescent Drug Abuse: a Program for Educators** (3)

Primarily for secondary school teachers, counselors, and administrators. Multidisciplinary lectures and discussions concerning the physiological and psychological effects of narcotics, central nervous system stimulants and depressants, alcohol, and hallucinogenic and psychedelic drugs; psychosocial factors leading to adolescent drug abuse; legal implications of drug abuse; prevention, control, and treatment of drug abuse.

Philosophy

Chairman: Thelma Z. Levine, Elton Professor of Philosophy; Rice 611, Telephone: 676-6266

61–62 **Introduction to Philosophy** (3–3)

Problems of modern philosophy in relation to scientific and social developments since the Renaissance. Phil 61: theories of reality. Phil 62: theories of knowledge. Phil 61 or 62 may be taken independently.

Physical Education

Chairman: J.L. Breen, Professor of Physical Education; K–20, Telephone: 676-6280

101 **Physical Education in the Elementary School** (3)

For Elementary Education and Physical Education majors. Implications of child growth and development for school and playground programs:

philosophy, curriculum, techniques of teaching, facilities and equipment, evaluation.

140 **Seminar: Comparative Environmental Education in Puerto Rico** (3)

215 **Administration of High School Athletics** (3)

Open only to majors in Physical Education. Lecture (2 hours), conference (1 hour). For the prospective high school athletic director. The philosophy, principles, and procedures essential for the administration and development of a sound athletic program.

258 **Safety Education—Care and Prevention** (3)

Care and prevention of athletic injuries, school safety, first aid, and liability. Leads to Instructor Certification in First Aid.

263 **Basic Simulation—Driver Education** (3)

Orientation and psychological foundations of simulator instruction. Operation, care, and preventive maintenance; organization and administration of a driver education simulator program.

265 **Driver and Safety Education III** (3)

Modern methods and materials in traffic safety and driver education; psychological testing; Drivucator; multiple car method.

Physics

Chairman: Julian Eisenstein, Professor of Physics; Corcoran 102. Telephone: 676-6275

Departmental prerequisite: Phys 31–32 or equivalent, and consent of a departmental adviser, are prerequisite to all courses in Physics numbered from 101 to 200.

ASTRONOMY

9–10 **Introduction to Astronomy** (3–3) (Campus Course)

Lecture (2 hours), recitation (1 hour), laboratory (2 hours). Classical through modern astronomy with introduction to basic principles underlying astronomical systems and observations. Primarily for nonscience majors. Laboratory fee, $11 a semester.

PHYSICS

1 **General Physics** (4) (Campus Course)

Topics in classical physics which form a foundation for modern physics. Prerequisite: two years of college preparatory mathematics or concurrent registration for Math 6. Laboratory fee, $11.

2 **Introduction to Modern Physics** (4) (Campus Course)

Selected topics in modern physics, including electromagnetic phenomena. Prerequisite: Phys 1 or equivalent. Phys 1 can be waived on the basis of the College Entrance Examination Board Achievement Test or Advanced Placement Examination or by a departmental examination prior to registration. Laboratory fee, $11.

Political Science

Chairman: H.L. LeBlanc, Professor of Political Science and Public Affairs; C–619, Telephone: 676-6290

Departmental prerequisite: P Sc 5–6 is prerequisite to courses in Political Science numbered from 101 to 200.

5–6 **Introduction to Political Science** (3–3)

P Sc 5: an introduction to the study of comparative political systems. Emphasis on contemporary concepts and techniques used to examine politics and government. P Sc 6: structure, powers, and processes of American political systems—Congress, the President, and the Supreme Court; elections, political parties, and pressure groups; state and local governments.

103–4 **State and Local Governments** (3–3)

P Sc 103: state and local political systems, theory of sub-national governments, intergovernmental relations, metropolitan government and politics. P Sc 104: urban political systems, issues in urban politics, city and regional planning, and the political process.

111 **Comparative Government and Politics** (3)

Introduction to the government and politics of the principal constitutional democracies of Western Europe: Great Britain, France, and the Federal Republic of Germany; secondary reference to other Western European systems and the communist government of East Germany.

*112 **Comparative Government and Politics** (3)

Introduction to the government and politics of the communist nations; emphasis on the Soviet Union and the countries of Eastern Europe.

117–18 **Political Theory: Nature and Growth of Western Political Thought** (3–3)

P Sc 117: foundations of Western political thought with emphasis on classical antiquity; Western political tradition. P Sc 118: the Renaissance and Reformation to recent times. Theoretical foundations of the modern state: morals and politics, sovereignty, absolutism, obedience, and resistance; liberalism, democracy, conservatism.

121–22 **U.S. Constitutional Law and Politics** (3–3)

P Sc 121: separation of powers, federal-state relationships, economic regulation. P Sc 122: political and civil rights. Prerequisite: junior status.

125 **The American Congress** (3)

Congress: the legislative process of the House of Representatives and Senate. The men, the committees, and the system.

126 **The American Presidency** (3)

Role of the Presidency in public policy formulation, development of the institution, the selection process, emphasis on legislative-executive relations.

*P Sc 112, 115, and 161 are related in their subject matter, and credit for only one of the three may be applied toward a degree.

145 **Political Parties and Politics** (3)

Organization and operation of political parties in the United States: party system and structure, role of ideology, voting behavior, campaigns and elections, devices for organizing the government.

146 **Political Pressures and Public Reactions** (3)

Public opinion, special interest lobbies, and pressure groups as they operate on government to influence public policy.

151 **Public Administration** (3)

Theory and practice of governmental administration, administrative systems in the public and private sectors, introduction to organization theory and behavior.

167 **U.S. Foreign Policy** (3)

Constitutional and political factors that determine the formulation, execution, and substance of U.S. foreign policy.

171 **International Politics** (3)

International actors, international and domestic environments of foreign policy, global and regional patterns, general characteristics of foreign policy.

172 **International Organizations** (3)

Development and operations of the United Nations, regional organizations, and functional international organizations.

181–82 **Public International Law and Organization** (3–3)

Survey of the public law of nations. P Sc 181: emphasis on the law of peace. P Sc 182: continuation of the law of peace; attention to neutrality and the so-called law of war.

190 **Politics of Middle and Southern Africa** (3)

Comparative analysis of the political systems of selected countries of non-Mediterranean Africa.

191 **Governments and Politics of the Middle East** (3)

Domestic and international politics of the eastern Arab states, Turkey, Iran, and Israel.

192 **Governments and Politics of North Africa** (3)

Domestic and international politics of Algeria, Tunisia, Morocco, Libya, Egypt, Sudan; their relations with states of the Middle East.

193 **Governments and Politics of South and Southeast Asia** (3)

Domestic and international politics of the major states in the area, particular reference to India.

194 **Governments of China and Japan** (3)

Institutions and processes of the government in contemporary China and Japan, with some historical background. Attention to ideological forces. Students who receive credit for P Sc 194 cannot receive credit for P Sc 162.

201 **Seminar: Scope and Methods of Political Science** (3)

Reading and Research.

212 **Seminar: Comparative Government and Politics** (3)

Selected topics in comparative political institutions and politics. Each semester is devoted to a selected country or significant institutional or policy problem. Attention is directed to questions of method.

229 **Readings in Soviet Government and Politics** (3)

Readings in contemporary Soviet domestic government and politics. Prerequisite: 3 semester hours selected from Hist 146, P Sc 112, or equivalent.

233 **Seminar: Soviet Government and Politics** (3)

Research seminar in selected problems of Soviet domestic government and politics. Emphasis: since Stalin. Prerequisite: P Sc 229 or permission of instructor.

271–72 **Problems in International Organizations** (3–3)

P Sc 271: analysis of the political dimension of international organizations; special reference to the United Nations. P Sc 272: examination of the operational and administrative aspects of international organizations; special reference to regional and functional bodies.

*283 **Topics in International Law** (3)

Consideration of theory, problems, and cases in the public law of nations including the law of peace and the law of war.

*285 **Diplomacy since World War II** (3)

Recent changes in diplomatic procedures and objectives as compared with those of earlier periods.

299–300 **Thesis Research** (3–3)

Psychology

Chairman: J.N. Mosél, Professor of Psychology; GG–213, Telephone: 676-6320

Departmental prerequisite: Psyc 1 or 5 or 6 is prerequisite to all other courses in Psychology. Six semester hours in Psychology courses are prerequisite to Psychology courses numbered above 100.

1 **General Psychology** (3)

Fundamental principles underlying human behavior.

8 **Psychology of Motivation and Personality** (3)

Introduction to psychology of personality. Principles of motivation, personality development, social and cultural factors, assessment and description of personality emphasized.

22 **Introduction to Educational Psychology** (3)

Consideration of individual and group differences, adjustments, and the psychology of learning in relation to education and training.

* Offered in War Colleges programs only.

29 **Psychology of Childhood** (3)

Developmental approach to study of the child. Emphasis on the socialization process, learning, and the child's view of the world.

101 **Abnormal Psychology** (3)

Causes, diagnosis, treatment, and prevention of various types of maladjustments and mental disorders. Prerequisite: 6 semester hours in psychology, or 3 in psychology and 6 in a biological science.

112 **Psychology of Adolescence** (3)

Psychological characteristics and problems peculiar to adolescence, with emphasis on applications of psychology to solution of such problems.

121 **Psychology of Learning** (3)

Current learning theories and issues.

129 **Theories of Personality** (3)

Survey of personality theories; emphasis on their application to problems of individuals.

131 **Psychological Tests** (3)

Survey of psychological tests and their more common uses in business, industry, government, law, medicine, and education. Material fee, $7.

144 **Personnel and Industrial Psychology** (3)

Psychological concepts and methods applied to problems of personnel management, human engineering, employee motivation, and productivity.

145 **Psychology of Management** (3)

Introduction to principles of industrial organizations and personnel selection. Departmental prerequisite waived.

151 **Social Psychology** (3)

Social foundations of attitudes and behavior: cognition, motivation, role-behavior, communication, small-group processes, racial attitudes, nationalism, and war.

156 **Psychology of Attitudes and Public Opinion** (3)

Psychology of opinion formation, measurement of opinion, social determinants of attitudes, psychological processes in propaganda, bases of receptivity to propaganda, psychological warfare.

Public Administration

Chairman: D.R. Cloutier, Professor of Public Administration; Government 302. Telephone: 676-6295

213 **Administration in Government** (3)

Critical analysis of federal administrative organizations as an integral part of the political system. Roles of Congress, the Presidency, the Courts, interest groups, political parties, and the public in the administrative process; special attention to centripetal and centrifugal forces.

215 **Comparative Administrative Systems** (3)

Examination and analysis of the administrative systems of selected foreign governments; attention to practices applicable to administration in the United States.

218 **Seminar: Developmental Administration II** (3)

Problem of the transfer of administrative capability from one country to another. Political and administrative development. Unilateral and multilateral approaches. The role of the innovator. Strategies of administrative development.

221 **Management in the Executive Branch** (3)

Analysis of application of management theory and practice in the executive branch of the federal government, emphasis on staff responsibilities and relationships and internal organization and control.

223 **Behavioral Factors in Large Organizations** (3)

Analysis of the nature and characteristics of bureaucracy: dysfunctionalism; approaches to policy guidance and leadership, particularly in large public organizations; influence and control systems.

231 **Public Personnel Administration** (3)

Survey of basic principles and functions of personnel administration in the public service. Roles of personnel management, recruitment, placement, wage and salary administration, training, retirement, and other personnel functions.

232 **Problems in Public Personnel Management** (3)

Analysis and evaluation of major personnel management problems in government; employee-management relations; interagency and intergovernmental relationships. Impact of automation. Evaluation of personnel systems.

233 **Seminar: Manpower Development and Utilization** (3)

Analysis of manpower resources. Research projects and case studies in ways and means of increasing employee potential; use of training programs, executive development, incentive systems.

235 **Technological Change and Manpower** (3)

Research, discussion, and readings dealing with manpower problems arising from automation and other technological changes. Evaluation of these developments in government and business; their implications for productivity, employment, training and education, and personnel and industrial relations. Analysis of economic, political, and social factors influencing public and private industry manpower policies.

246 **Urban Dynamics and Citizen Participation in Administration** (3)
(Formerly Urban Dynamics)

Exploration of the nature, costs, and benefits of citizen participation in administration of metropolitan area programs. Focus on tools of citizen participation, their impact on federal policy and reorganization of urban government, and the effect of decentralization on citizen participation.

248 **Financing Metropolitan Services** (3)

Analysis of the structure and administration of public finance of local governments.

249 **Administration in Metropolitan Area Governments I** (3)

Public administration in metropolitan areas. An ecological approach to understanding the interrelationship between the management of urban programs and economic, social, and political factors that affect the urban environment.

250 **Administration in Metropolitan Area Governments II** (3)

Application of policy analysis in metropolitan administration, including the consideration of specific federal, state, and local programs in metropolitan areas.

251 **Governmental Budgeting** (3)

Survey of the basic concepts, principles, and practices in governmental budgeting; interrelationship of planning, programming, and budgeting; their role in the management process.

252 **Problems in Planning, Programming, and Budgeting** (3)

Intensive analysis of developments in federal planning, programming, and budgeting; application of new tools in the decision-making process; evaluation of the systems.

254 **Seminar: Financial Management in the Federal Service** (3)

Functions and interrelationships of central federal financial management agencies, their policy, economic and managerial roles, controllership functions, and standards and practices in financial management.

260 **Seminar: Policy Formulation and Administration** (3)

Analysis in depth of factors and processes involved in policy development, with particular attention to selected areas of national policy; development of agency goals and objectives.

262 **Seminar: Science, Technology, and Public Policy** (3)

The impact of science and technology upon public administration in terms of both administrative practice and national policies.

299 **Thesis Seminar** (3) (Campus Course)

Examination of thesis standards, research philosophy and methodology.

300 **Thesis Research** (3)

Religion

Chairman: R.G. Jones, Professor of Religion; O-12, Telephone: 676-6325

9 **The Old Testament** (3)

Historical and literary study of the Old Testament with consideration of development of religious ideas, institutions, and outstanding personalities.

10 **The New Testament** (3)

Study of New Testament literature from the standpoint of occasion, purpose, dominant ideas, and permanent values. Emphasis on approach, structure, and significance of the Gospels and Epistles.

21 **Introduction to Religious Thought** (3)

Traditional religious concepts, language of contemporary religion amidst modern scientific and secular intellectual tendencies, and the place of religion in today's society.

59–60 **History of Religions** (3–3)

Origins, evolution, and contemporary status in historical context. Rel 59: primitive religion and the religions of the East (Hinduism, Buddhism, Taoism, Confucianism, Shinto). Rel 60: religions of the West and Near East (ancient religions, Judaism, Christianity, Islam).

127 **Medicine, Religion, and Healing** (1) (Campus Course)

Primarily for second-year students in the School of Medicine; open to Religion majors with the approval of the instructor. Introduction to the total care concept emphasizing the importance of religion in medical practice for patient and physician. Concept of the professional man, the clergy's role in healing, Jewish and Christian faiths and their attitudes in problem areas. Case studies.

216 **Supervised Clinical Pastoral Education** (I-A) (6)

A full-time program of clinical pastoral education in an approved center. Involvement in the responsibility for pastoral ministry is reviewed and evaluated in a peer-group context.

217 **Supervised Clinical Pastoral Education** (I-B) (6)

A continuation of Rel 216 with emphasis on pastoral and personal identity, sustained pastoral relationships, and pastoral methods and skills.

218 **Supervised Clinical Pastoral Education** (III-A) (6)

Responsibility in pastoral ministry is increased with emphasis on group work, interprofessional involvement, use of specific counseling methods, work with special persons with special problems. Prerequisite: Rel 216 and 217; or equivalent.

219 **Supervised Clinical Pastoral Education** (III-B) (6)

A continuation of Rel 218 with emphasis on the examination and review of administrative procedures, designing pastoral programs, and developing a pastoral theology.

222 **Seminar: Christian Ethics** (3) (Campus Course)

Important tendencies in ethical reflection of the contemporary Christian Church; contributions of social sciences to that reflection.

225 **The Dynamics of Ministering to the Young Adult** (3)

Conceptual models of development of young adults from late adolescence; special problems of educational and military experience, vocational choice, marriage and the family, and physical, intellectual, emotional, and religious development. Encounter experience with persons and groups.

227–28 **Advanced Studies in Pastoral Care** (3–3)

History and present state of methodologies and conceptual models of pastoral counseling and leadership in groups; supervised work in interfaith and multidisciplinary ministries.

232 **Seminar: Christianity since 1500** (3) (Campus Course)
(Formerly Rel 233–34 Seminar: Reformation and Modern Christianity (3–3))
Selected topics.

235 **Seminar: Roman Catholicism in the Modern World** (3) (Campus Course)
Important leaders and their ideas in selected developments since 1500—doctrinal, spiritual, biblical, liturgical, and ecumenical.

237 **Seminar: Theological Analysis** (3) (Campus Course)
Historical and topical study of the development of important ideas in such areas as Christology, soteriology, and ecclesiology.

299–300 **Thesis Research** (3–3)

Slavic Languages and Literatures

Chairman: C.A. Moser, Associate Professor of Russian; 522 21st St., 1st floor, Telephone: 676-6335

Placement Examination: A standardized placement examination given before registration is required of all entering students who wish to continue in college the language begun in high school. Upon completion of the examination, assignment is made to the appropriate course, with credit assigned on the usual basis.

1–2 **First-year Russian** (3–3) (Campus Course)
A year course: credit toward a degree at this University given on completion of Slav 2. Beginners' course in fundamentals of grammar and pronunciation with graded reading, oral drill, and written practice. Listening comprehension and oral practice in language laboratory. Laboratory fee, $17.50 a semester.

3–4 **Second-year Russian** (3–3) (Campus Course)
A year course: credit toward a degree at this University given on completion of Slav 4. Systematic review of grammar. Study of special problems of Russian morphology and syntax. Oral and written reports on assigned topics. Prerequisite: Slav 1–2 or two years of high school Russian. Laboratory fee, $17.50 a semester.

9–10 **Russian Conversation and Composition** (3–3) (Campus Course)
Listening comprehension; oral and written practice. Prerequisite: Slav 4 or permission of instructor.

91–92 **Introduction to Russian Literature** (3–3)
Survey of Russian literature, in translation, from earliest periods through literary masterpieces of the 19th and early 20th centuries. Lecture, recitation, and discussion—in English. Term paper required.

109–10 **Advanced Russian Conversation and Composition** (3–3)
Developing proficiency in oral and written expression. Prerequisite: Slav 10 or equivalent.

161–62 **Russian Culture** (3–3)

Survey of Russian cultural heritage from origins of ancient Russia to present—in English. Lecture, recitation, discussion, and individual reports on assigned topics.

165 **Soviet Literature from the Revolution to World War II** (3)

Basic themes, issues, literary figures of the Soviet 1920's. The fate of literature and writers under increasing state control; Five-year Plan literature. Lecture, discussion, reports—in English.

166 **Soviet Literature from World War II to the Present** (3)

Literature in wartime, under Stalinism, and in the "thaws." The new generation of dissident liberals and "underground" literature. Lecture, discussion, reports—in English.

193–94 **Introduction to Slavic (non-Russian) Literature—in English** (3–3)

An examination of non-Russian Slavic literatures from their beginnings to the present day. Emphasis on themes, ideas, and styles peculiar to each literature. The impact of national events and culture on each.

Sociology

Chairman: R.G. Brown, Professor of Sociology; D-201, Telephone: 676-6346

Departmental prerequisite: Soc 1 and either 2 or 61 are prerequisite to all other courses in Sociology.

1–2 **Introductory Sociology** (3–3)

Soc 1: general principles of sociology; development of culture and personality, impact of groups and institutions on man's social behavior. Survey of fields within sociology. Soc 2: analysis of major social problems confronting the United States; factors producing social problems, their nature and treatment.

61 **Development of Social Thought** (3)

Examination of concepts and theories relevant to the nature of society and human relationships from ancient writings to the 20th century. Prerequisite: Soc 1.

124 **Medical Sociology** (3)

Social factors and processes related to the etiology and treatment of physical and mental illness; medical occupations and professions and their patterned social relationships within medical organizations, principally hospitals; problems of delivery of health care services.

126 **Urban Sociology** (3)

Place of the city in larger society; growth of the city, problems of urban living, group life, personality, urban housing, city planning, and suburban development.

127 **Population Problems** (3)

Composition of populations, trends in population growth and population pressure, factors producing population movements, effects of migration, population policies—eugenics and birth control.

130 **Social Stratification** (3)

Analysis of distribution of resources and opportunities for participation, education, and social mobility in American society; comparison of distribution of resources in the United States with that in other nations; analysis of public policies which affect these distributions.

133 **Sociology of Education** (3)

Analysis of educational systems from an institutional and organizational perspective and as agencies of socialization; relationships of education in general to society, including technological, communal, and subcultural components. Student teams study educational problems, policies, and issues of their own choosing.

134 **Marriage and the Family** (3)

Courtship as a social process, marriage and marital adjustment, development of the family, parent-child relations, family problems, disorganization, divorce, and family reorganization.

135 **Juvenile Delinquency** (3)

Factors producing delinquency, juvenile detention, the juvenile court, training schools, treatment of offenders.

136 **Criminology** (3)

Nature and distribution of crime as related to the development and operation of criminal law and various social and legal institutions in urban society.

139 **Society and the Deviant** (3)

Analysis of relationships of society, socialization, and deviancy. Social responses to deviancy and criminal offenders; rehabilitative programs in community, courts, and schools.

141 **Social Research Methods** (3)

Introduction to scientific method in the development of social theory and the solution to social problems. Prerequisite: Stat 53 or 104.

149 **Modern Sociological Theory** (3)

Systematic study of contemporary schools of sociological theory, both European and American development; evaluation of scientific contributions of each school. Prerequisite: Soc 61.

210 **Theoretical Foundations of Political Sociology** (3)

(Formerly Seminar: Political Sociology)

A review of the theoretical literature relevant to the sociology study of political processes; emphasis on concepts of power and authority, leadership, alienation, ideology, political socialization, and political change.

228 **Seminar: Urban Social Problems** (3)

Detailed examination of the relationship between various institutions and problems of the city and urban society. Focus on different institutions or problems in different semesters.

Spanish*

Chairman: J.F. Burka, Professor of French; A-11, Telephone: 676-6330

Placement Examination: A standardized placement examination given before registration is required of all entering students who wish to continue in college the language begun in high school. Upon completion of the examination, assignment is made to the appropriate course, with credit assigned on the usual basis.

1–2 **First-year Spanish** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Span 2. For beginners. Pronunciation, conversation, grammar, composition, reading of modern Spanish prose. Aural training, oral practice in language laboratory. Laboratory fee, $17.50 a semester.

3–4 **Second-year Spanish** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Span 4. Conversation, grammar, composition, reading of modern Spanish prose, introduction to Hispanic civilization. Aural training, oral practice in language laboratory. Prerequisite: Span 1–2 or two years of high school Spanish. Laboratory fee, $17.50 a semester.

Special Education

Chairman: Perry Botwin, Professor of Special Education; C-429, Telephone: 676-6170

200 **Understanding Young Children** (3)

Lecture and field experience. Basic concepts of early child development as applied to special education. Admission by permission of instructor.

201 **Introduction to Special Education** (3)

Survey course to acquaint prospective teachers with special education and to help them become aware of the various educational modifications necessary to accommodate children in a school program.

204 **Problems in Urban Education** (3)

Problems and issues in urban education; emphasis on factors affecting successful educational practice in low-income areas. Admission by permission of instructor.

240 **Educational Programming for Children with Behavioral Problems** (3)

Analysis of educational provisions for children with behavioral problems through study of ecological considerations in the light of contemporary special education theory. Admission by permission of instructor.

241 **Preprofessional Internship: Children with Behavioral Problems** (6)

Practicum experience early in the training sequence, consisting of observation of, and interaction with, children with behavioral problems under the direction of qualified teachers in a field setting and the supervision of the University staff. Admission by permission of instructor.

*Administered by the Department of Romance Languages and Literatures.

242 **Clinical Teaching of Children with Behavioral Problems** (3)
Lectures and discussions exploring various psychoeducational techniques of teaching children and adolescents with behavioral problems, interpersonal interaction between teachers and disturbed children, use of group factors in the teaching-learning process, and selection of appropriate teaching methods and materials. Admission by permission of instructor.

250 **Specialized Techniques and Materials for Diagnostic-Prescriptive Teachers** (3)
(Formerly Advanced Specialized Teaching Techniques and Materials)
Selected materials and techniques used in diagnostic-prescriptive teaching. Must be taken concurrently with S Ed 252. Admission by permission of instructor.

251 **Psychosocial Factors in Diagnostic-Prescriptive Teaching** (3)
(Formerly Psychosocial Considerations in Special Education)
Psychosocial factors significant in the process of diagnostic-prescriptive teaching. Admission by permission of instructor.

252 **Professional Internship for Diagnostic-Prescriptive Teachers** (3)
Supervised school experience in diagnostic-prescriptive teaching. Must be taken concurrently with S Ed 250. Admission by permission of instructor.

253 **The Humanizing Curriculum and Diagnostic-Prescriptive Teaching** (3)
Curriculum concepts and modifications aimed at enhancing the classroom environment for learning and growth. Admission by permission of instructor.

260 **Diagnosis of the Educational Needs of Younger Children** (3)
Lecture-demonstration course designed to explore the existing and experimental diagnostic tools to aid in education planning for young children. Admission by permission of instructor.

261 **Special Methods for Teaching Young Children** (3)
Study and laboratory practice in specialized techniques and materials for young children. Students develop and experiment with new methods and materials. Admission by permission of instructor.

262 **Seminar: the Education of Young Exceptional Children** (3)
Weekly seminar dealing with concepts and topics pertinent to the education of young exceptional children. Admission by permission of instructor.

263 **Introduction to the Education of the Severely and Multiply Handicapped** (3)
(Formerly Special Teaching of Severely- and Multiply-handicapped Children)
Survey of the characteristics and learning patterns of children with severe disabilities. Lecture and field experience.

264 **Advanced Study in the Special Education of the Severely and Multiply Handicapped** (3)
Specialized programs, techniques, and methods for teaching children with severe disabilities.

265 **Utilization of Supportive Personnel in Early Educational Programs for Exceptional Children** (3)

Methods and opportunities for the use of para-professionals, volunteers, and parents in the education of young children with special needs.

269 **Clinical Teaching in Early Childhood Education** (3)

Supervised clinical internship in special education with young children. Admission by permission of instructor.

291 **Practicum in Teaching Children with Behavioral Problems** (6)

Supervised student teaching in programs for children with behavioral problems under the direction of a qualified teacher and the supervision of the University staff. Admission by permission of instructor.

292 **Practicum in Teaching Young Children in Special Education** (3)

Supervised student teaching in special education in classrooms for young children.

294 **Practicum in Diagnostic-Prescriptive Teaching** (6)

Supervised field experience in diagnostic-prescriptive teacher programs. Admission by permission of instructor.

303 **Administration and Supervision of Special Education** (3)

Philosophy and nature of special education; program organization, administration, and development. Surveying local-level needs; program evaluation and supervision. Admission by permission of instructor.

304 **Recent Research and Trends in Special Education** (3)

Emphasis on research methodology and considerations. The unique problems of doing research in special education. Procedures and sources for obtaining research funding. Admission by permission of instructor.

306 **Guidance and Counseling Families of Children with Special Needs** (3)

Working with parents and community agencies in meeting the educational and social needs of young children. Admission by permission of instructor.

308 **Instructional Media, Technology, and Education** (3)

Review and consideration of technological developments as they affect education and special education, including historical perspective; operating principles of various kinds of hardware, including printing, audio-visual equipment, television, and computers. Status of software for use with hardware. Admission by permission of instructor.

342 **Seminar: Crisis/Resource Teaching** (3)

Topics and concepts relevant to an exploration of alternative models in the education of children perceived as having learning behavior problems. Admission by permission of instructor.

343 **Psychoeducational Diagnosis of Children with Behavior or Learning Difficulties** (3)

Lecture and laboratory course designed to develop *educational* strategies for children who present behavior or learning problems in the schools. Admission by permission of instructor.

345 **Public School Consultation and Program Planning for Children with Behavioral Problems** (3)

Exploration of mental health consultation models in public schools, in-service training programs for educational personnel, and special programming for behaviorally disordered children in the schools. Extensive field work experience in conjunction with the lecture/discussion format. Admission by permission of instructor.

350 **The Diagnostic-Prescriptive Teacher** (3)

Rationale, operational models, techniques, and problems relevant to implementation of diagnostic-prescriptive teacher programs. Admission by permission of instructor.

351 **Seminar for Diagnostic-Prescriptive Teachers** (3)

Current practices in regular and special education as they affect the diagnostic-prescriptive teacher; emphasis on concurrent field experience. Admission by permission of instructor.

360 **Learning Disabilities: Identification and Implications** (3)

A study of the nature of various learning disabilities and the implications for meeting the developmental needs of the child.

370 **Intrapersonal Dynamics in Special Education** (3)

Small group exploration of intrapersonal factors essential to understanding roles and interpersonal techniques in teaching exceptional children. Admission by permission of instructor.

Speech and Drama

Chairman: G.F. Henigan, Professor of Speech; Auditorium 6, Telephone: 676-6350

1 **Communicative Speaking and Listening** (3)

Basic theories and principles of speech communication; composition, delivery, and criticisms of speaking in interpersonal, group, and public situations. Recording fee, $2.

11 **Voice and Diction** (3)

Development of naturalness, correctness, and clarity in conversational speech. Analysis and correction of individual speech delivery faults through tapes and weekly performances. Class instruction on concepts of acceptable voice and diction standards. Recording fee, $4.

91 **Parliamentary Procedure and Group Participation** (3)

Principles and procedures for effective speech communication to function successfully at various levels of responsibility in academic, social, professional, civic, or business organizations. Prerequisite: Sp&D 1 or 11, or permission of instructor.

*111 **Business and Professional Speaking** (3)

Study of the communication process in business and professional speaking; practice in presenting technical reports; selling policies, programs,

* This course can be adapted to the needs of a specific group.

and services; interviews; conferences; speech in training and supervisory activities. Primarily for nonmajors.

121 **Group Discussion and Conference Leadership** (3)

Process of thinking and problem-solving in committees and small groups; methods of leading discussions and conferences. Prerequisite: Sp&D 1 or permission of instructor.

Statistics

Chairman: Solomon Kullback, Professor of Statistics; C-311, Telephone: 676-6355

Departmental prerequisite: one entrance unit in algebra is prerequisite to courses in Statistics numbered below 100.

*51 **Introduction to Business and Economic Statistics** (3) (Campus Course)

Lecture (3 hours), laboratory (1 hour). Frequency distributions, descriptive measures, probability, sampling, estimation, tests of hypotheses, correlation, time series, index numbers. Laboratory fee, $11.

*52 **Mathematics of Finance** (3) (Campus Course)

Interest and discount, annuities, valuation of stocks and bonds, sinking funds, amortization, valuation of depletable assets, depreciation.

101–2 **Basic Principles of Statistical Methods** (3–3)

Variables and attributes, averages and dispersion, elementary principles of sampling, introduction to the making of statistical decisions.

107 **Statistics for Engineers** (3)

Probability models, discrete and continuous distributions, sampling, hypothesis testing and estimation, engineering applications. Prerequisite: Differential and integral calculus.

109–10 **Quality Control and Reliability Techniques** (3–3)

Statistical methods and probability models for quality control and reliability applications. Prerequisite: Stat 91 or 107.

111 **Business and Economic Statistics I** (3)

Statistical processes as tools in decision-making in areas of economics and business. Prerequisite: Stat 51 or permission of instructor.

112 **Business and Economic Statistics II** (3)

Case work to illustrate quantitative procedures for solution of economic and business problems. Prerequisite: Stat 111 or equivalent.

*Stat 101–2, *Basic Principles of Statistical Methods* (3–3), which is offered off campus, may be substituted

APPENDIX: RECENTLY ESTABLISHED REGULATIONS

THE FOLLOWING UNIVERSITY REGULATIONS are under review and may be subject to change in connection with the establishment of judicial processes. Bulletins and handbooks incorporating any changes will be issued as appropriate.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on October 19, 1968:

Whereas, safety and order are essential preconditions of the learning process, and indeed of the very concept of a university; and

Whereas, The George Washington University is committed to protection of free speech and freedom of assembly, and to safeguarding the right of lawful protest on campus; and is committed equally to maintaining the peace and safety of the campus, in the knowledge that all rights are in jeopardy when violence and civil disorder prevail over law and reason;

Now, therefore, be it resolved by the Senate of The George Washington University: that in the event a demonstration at this University exceeds the bounds of free assembly and lawful advocacy, and demonstrators are engaging in unlawful acts which cause or imminently threaten injury to persons or property, or which obstruct or interfere with normal and necessary University activities, this body affirms the authority of the President, or other University officials designated to act in his absence, to take such reasonable steps, if possible after consultation with the Chairman of the Executive Committee of the University Senate and the President of the Student Body, as are required to restore and preserve order; including, if deemed necessary and appropriate, suspension of students or faculty engaging in such acts, and use of such law enforcement personnel as are needed to effect the removal, arrest, and prosecution of law violators. Any such suspension shall be reviewed by an appropriate tribunal as soon after order is restored as is practicably possible.

The following was approved by the University's Board of Trustees on October 19, 1968:

Any student suspended from The George Washington University on the grounds of exceeding the bounds of free assembly and lawful advocacy shall have his suspension reviewed by the Hearing Committee on Student Affairs of The George Washington University as soon after order is restored as is practicably possible.

The following resolution, submitted by the Student Life Committee, was approved by the University's Board of Trustees on October 19, 1968:

Be it resolved that The George Washington University: affirms its traditional commitment to freedom of expression (a) by continuing to permit business and government organizations which are recruiting employees to conduct their activities at designated places on campus, and (b) by placing no obstacle to students who may wish to protest the presence of such recruiters, provided, however, that such protest shall be orderly and shall not impede or disrupt the recruiter in his activities.

The University affirms its place as a forum for the free exchange of ideas (a) by assuring that guests invited to speak on this campus at duly scheduled meetings shall have the right to appear and to be heard, and (b) by sanctioning the freedom of students to express dissent from the views of the speaker, provided, however, that that expression of dissent be orderly and nonobstructive.

The University distinguishes between orderly protest and resistance-by-obstruction; it accepts the former as a legitimate expression of dissent while rejecting the latter as an abridgement of the freedoms of the individuals who may be its object.

The following was approved by the University's Board of Trustees on October 19, 1968:

The George Washington University is opposed to discrimination based on race, color, or creed. Such discrimination may have appeared in campus organizations in the past. In the future, however, no organization can be recognized or supported by the University unless it provides continued assurance of nondiscrimination in membership practices and in intent, considered adequate by relevant committees and officers of the University.

The following was approved by the University's Board of Trustees on October 19, 1968:

The University cannot condone violations of law, including violation of those laws which proscribe possession, use, sale, or distribution of certain drugs. Members of the academic community should know that administrative action, which may include dismissal from the residence halls, revocation of other privileges, or suspension or dismissal from the University, may be taken in order to protect the interests of the University and the rights of others.

The Board of Trustees reaffirms the responsibility of the President and the Faculty to continue to implement this policy.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on January 16, 1969:

Be it resolved by the Senate of The George Washington University: Any member of the University (including as members of the University all persons having a formal connection with the University)

(a) who engages in conduct that unreasonably obstructs teaching, research, and learning, or

(b) who unreasonably obstructs free access to members or guests of the University or to University buildings, or

(c) who disobeys general regulations of the University, or

(d) who damages University property or injures members or guests of the University,

may be punished for his conduct by dismissal from the University, or by some lesser disciplinary action, through procedures established within the University for the government of its members.

In order to insure due process, any student subject to dismissal or other disciplinary action on the grounds of violating any of the premises of this resolution shall have, at his discretion, the right of review of the action by the University Hearing Committee on Student Affairs.

ANNUAL ISSUES OF THE UNIVERSITY BULLETIN

Requests for the following publications must include your zip code and should be addressed as indicated.

COLLEGE OF GENERAL STUDIES, Dean of the College

NATIONAL LAW CENTER, Dean of the Center

SCHOOL OF ENGINEERING AND APPLIED SCIENCE, Dean of the School

UNDERGRADUATE AND GRADUATE CATALOGUE (Arts and Sciences, Education, Government and Business Administration, Public and International Affairs), Office of Admissions

SCHOOL OF MEDICINE, Admissions Office, School of Medicine

SUMMER SESSIONS, Dean of the Summer Sessions

SCHEDULE OF CLASSES: FALL AND SPRING SEMESTERS, Registrar

SCHEDULE OF CLASSES: SUMMER SESSIONS, Dean of the Summer Sessions

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6/71—Cornelius—16M

COLLEGES AND SCHOOLS—DEGREE PROGRAMS

COLUMBIAN COLLEGE OF ARTS AND SCIENCES. Associate in Arts (A.A.), Associate in Arts in General Studies (A.A. in Gen Std.), Bachelor of Arts (B.A.), Bachelor of General Studies (B.Gen.Std.), Bachelor of Science (B.S.), Bachelor of Science in Environmental Health (B.S. in Env.Health), Bachelor of Science in Geodetic and Cartographic Science (B.S. in Geod. and Cart.Sc.), Bachelor of Science in Medical Technology (B.S. in Med. Tech.), and Bachelor of Science in Oceanography (B.S. in Ocea.)

GRADUATE SCHOOL OF ARTS AND SCIENCES: Master of Arts (M.A.), Master of Arts in Special Studies (M.A. in Sp.Std.), Master of Fine Arts (M.F.A.), Master of Music (Mus.M.), Master of Science (M.S.), Master of Science for Teachers (M.S. for Teachers), Master of Science in Forensic Science (M.S. in Forens.S.), Master of Science in Special Studies (M.S. in Sp.Std.), Master of Science in Special Studies (Oral Biology) (M.S. in Sp.Std. (Or.B.)), and Doctor of Philosophy (Ph.D.)

SCHOOL OF MEDICINE: Doctor of Medicine (M.D.)

NATIONAL LAW CENTER: Juris Doctor (J.D.), Master of Laws (LL.M.), Master of Comparative Law (M.Comp.L.), Master of Comparative Law (American Practice) (M.Comp.L.(Am.Prac.)), and Doctor of Juridical Science (S.J.D.)

SCHOOL OF ENGINEERING AND APPLIED SCIENCE: Bachelor of Science (Civil Engineering) (B.S. (C.E.)), Bachelor of Science (Electrical Engineering) (B.S. (E.E.)), Bachelor of Science (Mechanical Engineering) (B.S. (M.E.)), Master of Engineering Administration (M.E.A.), Master of Science (M.S.), and Doctor of Science (D.Sc.)

SCHOOL OF EDUCATION: Bachelor of Arts in Education (B.A. in Ed.), Bachelor of Science in Physical Education (B.S. in P.E.), Master of Arts in Teaching (M.A.T.), Master of Arts in Education (M.A. in Ed.), Education Specialist (Ed.S.), and Doctor of Education (Ed.D.)

SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION: Bachelor of Business Administration (B.B.A.), Bachelor of Science in Administration (B.S. in Adm.), Master of Arts in Government (M.A. in Govt.), Master of Arts in Health Care Administration (M.A. in H.C.A.), Master of Business Administration (M.B.A.), Master of Public Administration (M.P.A.), Master of Science in Administration (M.S. in Adm.), Master of Urban and Regional Planning (M. of Urb. and Reg.Plan.), Post-Master's Graduate Certificate in Health Care Administration (Post-Master's Grad.Cert. in H.C.A.), Doctor of Business Administration (D.B.A.), and Doctor of Public Administration (D.P.A.)

SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS: Bachelor of Arts (B.A.), Master of Arts (M.A.), and Master of Science in International Affairs (M.S. in I.A.)

THE GEORGE WASHINGTON UNIVERSITY

COLUMBIAN COLLEGE OF ARTS AND SCIENCES, 1821

THE GRADUATE SCHOOL OF ARTS AND SCIENCES, 1893

THE SCHOOL OF MEDICINE, 1825

THE NATIONAL LAW CENTER, 1865

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE, 1884

THE SCHOOL OF EDUCATION, 1907

THE SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION, 1925

THE SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS, 1928

THE COLLEGE OF GENERAL STUDIES, 1950

THE DIVISION OF UNIVERSITY STUDENTS, 1950

THE SUMMER SESSIONS, 1910

THE UNIVERSITY HOSPITAL, 1898

THE UNIVERSITY'S
150TH ANNIVERSARY YEAR
1821-1971

THE GEORGE WASHINGTON UNIVERSITY BULLETIN



SUMMER
SESSIONS
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1971



THE GEORGE WASHINGTON UNIVERSITY CAMPUS / WASHINGTON, D.C.

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THE SUMMER SESSIONS 1971

WASHINGTON, D.C. 20006

FACTS ABOUT GEORGE WASHINGTON UNIVERSITY

General Information	Private, nonsectarian, coeducational, founded 1821
Location	Washington, D.C., bounded by Pennsylvania Avenue and 19th, F, and 24th Streets, N.W.
Number of Students 1970 Summer Sessions	5,244 (3,346 men, 1,898 women)
Geographical Origin of Students 1970 Summer Sessions	*48 states, District of Columbia, Puerto Rico, Virgin Islands, 70 foreign countries*
Number of Full-time Faculty 1970 Summer Sessions	228
Number of Part-time Faculty 1970 Summer Sessions	96
Students from Other Institutions Enrolled in the 1970 Summer Sessions	320 students from 182 institutions
Residence Hall Rates 1971 Summer Sessions	Multiple occupancy, $125 a five-week session; single occupancy, $175 a five-week session (see page 22)

Undergraduate majors: Accounting, American Civilization, American Literature, Anthropology, Applied Mathematics, Applied Statistics, Art History and Theory, Biology, Botany, Business Administration, Business and Economic Statistics, Chemistry, Chinese Studies, Civil Engineering, Classical Archeology and Greek, Classical Humanities, Dramatic Art, Economics, Electrical Engineering, Elementary Education, English Literature, Fine Arts, French Language and Literature, Geography, Geology, Germanic Languages and Literatures, History, International Affairs, International Business, Journalism, Latin, Latin American Studies, Mathematical Statistics, Mathematics, Measurement Science, Mechanical Engineering, Medical Technology, Music (Applied, History and Literature, Theory), Philosophy, Physical Education, Physics, Political Science, Premedicine, Psychology, Public Affairs, Religion, Russian Language and Literature, Secondary Education, Sociology, Spanish American Literature, Spanish Language and Literature, Speech Communication, Speech Pathology and Audiology, Zoology.

Study leading to graduate or professional degrees is offered in the Graduate School of Arts and Sciences, the National Law Center, the School of Medicine, the School of Engineering and Applied Science, the School of Education, the School of Government and Business Administration, and the School of Public and International Affairs.

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A SUMMER SEMESTER IN THE NATION'S CAPITAL

THE GEORGE WASHINGTON UNIVERSITY offers a two-term summer program which makes it possible for students to earn 14 semester hours of credit during the summer months. The Library, classrooms, and residence hall are air-conditioned. For term dates, see the calendar on pages 5 and 6.

CALENDAR FOR THE 1971 SUMMER SESSIONS

Application for Graduation—An "Application for Graduation" form *must* be filed and the appropriate fee paid at the time of registration for the summer session of the senior or final year. Students completing degree requirements during the Summer Sessions will be awarded diplomas (no formal convocation) September 30, 1971, provided they have completed all degree requirements and have applied for graduation as a part of registration for the Summer Sessions.

COLUMBIAN COLLEGE OF ARTS AND SCIENCES

GRADUATE SCHOOL OF ARTS AND SCIENCES

SCHOOL OF ENGINEERING AND APPLIED SCIENCE

SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION

SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS

DIVISION OF UNIVERSITY STUDENTS

First Session

June 14	Registration for first 5-week session and 8-week courses (10 am–7 pm) *Monday*
June 15	First 5-week session classes and 8-week courses begin *Tuesday*
June 30	D.B.A., D.P.A., and Ph.D. dissertations completed in the summer due in appropriate Dean's Office *Wednesday*
July 5	Holiday *Monday*
July 20	First 5-week session classes end *Tuesday*
July 21	First 5-week session examination day *Wednesday*
August 6	Eight-week courses end *Friday*
August 25	Master's theses completed in summer due in appropriate Dean's Office *Wednesday*

Second Session

July 22	Registration for second 5-week session (10 am–6 pm) *Thursday*
July 23	Second 5-week session classes begin *Friday*
August 6	Eight-week courses end *Friday*
August 25	Master's theses completed in summer due in appropriate Dean's Office *Wednesday*
August 26	Second 5-week session classes end *Thursday*
August 27	Second 5-week session examination day *Friday*

NATIONAL LAW CENTER

June 7	Registration for all sessions (12–7 pm) *Monday*
June 8	First session and 13-week session begin *Tuesday*
July 5	Holiday *Monday*
July 16	First-session classes end *Friday*
**July 19–21*	First-session examination period *Monday–Wednesday*
July 22	Registration for students attending 2d session only (2–6 pm) *Thursday*
July 23	Second-session classes begin *Friday*
September 1	Last day of classes *Wednesday*
September 2–4	Second session and 13-week session examination period *Thursday–Saturday*

SCHOOL OF EDUCATION

June 14	First 3-week workshop session registration (10 am–7 pm) *Monday*
June 15	First 3-week workshop session classes begin *Tuesday*
July 2	First 3-week workshop session classes end *Friday*
July 5	Holiday *Monday*
July 6	Second 3-week workshop session registration (9 am–6 pm); classes begin *Tuesday*
July 6	Six-week session registration (9 am–6 pm); classes begin *Tuesday*
July 6	Ed.D., Ed.S., and M.A. in Ed. July comprehensive examination applications due *Tuesday*
July 17	National Teacher Examinations *Saturday*
July 23	Second 3-week workshop session classes end *Friday*
July 24	Ed.D., Ed.S., and M.A. in Ed. comprehensive examinations *Saturday*
July 26	Third 3-week workshop session registration (9 am–5 pm); classes begin *Monday*
August 13	Six-week session and third 3-week workshop session classes end *Friday*
August 13	Ed.D. dissertations completed in summer due *Friday*

FALL SEMESTER 1971–72

September 16–18	Registration—*Thursday–Saturday*

* Classes scheduled Wednesday evenings for the 13-week session will meet on Wednesday, July 21.

THE UNIVERSITY

STORY AND ORGANIZATION

E GEORGE WASHINGTON UNIVERSITY had its beginning in 1821 as The Column College in the District of Columbia. The name of the institution was anged in 1873 to Columbian University and in 1904 to The George Washing- University. The debt of the University to George Washington, whose name ears, is an intangible one.

George Washington, as President and as private citizen, had urgently insisted on the establishment of a National University in the Federal City. There he ged that, while being instructed in the arts and sciences, students from all ts of the country would acquire the habits of good citizenship, throwing off al prejudices and gaining at first hand a knowledge of the practice, as well he theory, of republican government. To further the materialization of his es, Washington left a bequest of fifty shares of The Potomac Company wards the endowment of a University to be established within the limits of District of Columbia, under the auspices of the General Government, if government should incline to extend a fostering hand towards it." The gress never extended "a fostering hand." The Potomac Company passed of existence, and Washington's bequest became worthless.

ully conscious of Washington's hopes, but motivated primarily by a great sionary urge and the need for a learned clergy, a group of dedicated isters and laymen sponsored a movement for the establishment of a college he District of Columbia. Inspired largely by the zeal and energy of the erend Luther Rice, they raised funds for the purchase of a site and peti- ed Congress for a charter. After much delay and amendment, Congress ted a charter which was approved by President Monroe on February 9, . To safeguard the College's nonsectarian character it provided "that per- of every religious denomination shall be capable of being elected Trustees: shall any person, either as President, Professor, Tutor or pupil, be refused ttance into said College, or denied any of the privileges, immunities, or ntages thereof, for or on account of his sentiments in matters of religion." uring the entire time when the institution was known as Columbian Col- its activities were centered on College Hill, a tract of forty-six and a half between the present Fourteenth and Fifteenth Streets extending north Florida Avenue to somewhat beyond Columbia Road. The Medical School

was located downtown. For the better part of the Columbian University period, the buildings of the University were situated along H Street between Thirteenth and Fifteenth Streets. The Medical School group still remains there.

During the last half century the University's present plant has been developed in that section of the old First Ward familiarly known as "Foggy Bottom," between Nineteenth and Twenty-fourth Streets, south of Pennsylvania Avenue. Within a few squares are the White House, the Department of the Interior, the State Department, the World Bank, and many other governmental offices and international agencies. The area is not without its reminders of historic interest to the University. President Monroe, who signed the Charter, lived at 2017 Eye Street. The first President of the Board of Trustees, the Reverend Obadiah B. Brown, was for fifty years the pastor of a church at Nineteenth and Eye Streets, and Washington selected Twenty-third and E Streets as the site of the National University he hoped to see established.

The University as it is now organized consists of Columbian College of Arts and Sciences (undergraduate); the Graduate School of Arts and Sciences; the professional schools, which include the National Law Center and the schools of Medicine, Engineering and Applied Science, Education, Government and Business Administration, and Public and International Affairs; the College of General Studies; the Division of University Students; and the Summer Sessions.

The George Washington University is privately endowed and is governed by a self-perpetuating Board of Trustees of which the president is an ex officio member.

ACADEMIC STATUS

The George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Secondary Schools.

The University is on the approved list of the American Association of University Women and is a member of the College Entrance Examination Board.

The National Law Center is a charter member of the Association of American Law Schools and is approved by the Section of Legal Education and Admissions to the Bar of the American Bar Association. The School of Medicine is a member of the Association of American Medical Colleges and is one of the medical colleges which have been continuously approved by the American Medical Association. Curricula of the School of Engineering and Applied Science in Civil, Electrical, and Mechanical Engineering are accredited by the Engineer's Council for Professional Development. The School of Education is a charter member of the American Association of Colleges for Teacher Education and is accredited by the National Council for Accreditation of Teacher Education for its Bachelor's and Master's degree programs. The Department of Chemistry is on the approved list of the American Chemical Society. The School of Government and Business Administration maintains full membership in the Middle Atlantic Association of Colleges of Business Administration, and by invitation, in 1968, the School became a charter academic member of the American Association of Collegiate Schools of Business Assembly. The Programs in Public Accounting designed to prepare students for Certified Public Accountants examinations have been approved by the state boards of New York and Maryland. The program in Hospital Administration has been accredited by the Association of University Programs in Hospital Administration since 1962.

EDUCATIONAL FACILITIES

The University Library.—The University Library contains over 517,000 volumes and, with the exception of the law and medical collections, is housed in the Library Building.

Regulations governing the use of the Library, the circulation of books, and the use of reserve books and periodicals are available at the service desks of the Library.

Other Library Facilities in Washington.—The student has access also to the Library of Congress, the Public Library of the District of Columbia and its branches, the Library of the Pan American Union, the Library of the Bureau of Railway Economics, the Library of the United States Department of Agriculture, the Library of the United States Office of Education, the National Library of Medicine, the Library of the Smithsonian Institution, and many other great special collections of the government departments.

Research Facilities of Washington.—The arrangement of the summer schedule of classes permits the full-time student to avail himself of the opportunity to study, at first hand, the working of the Federal Government and so to form a background for intelligent and useful citizenship.

In the departmental libraries of the Federal Government are a multitude of reports made by eminent specialists in all fields of science on the results of study and research in the bureaus, experimental stations, laboratories, museums, and observatories of the Nation.

In addition to the governmental collections the student has available the research facilities of such scientific and educational groups, whose headquarters are situated in Washington, as the Carnegie Institution, the American Council on Education, the National Academy of Sciences, the National Research Council, the National Education Association, and the National Geographic Society.

CONSORTIUM OF UNIVERSITIES OF THE WASHINGTON METROPOLITAN AREA, INC.

Five universities in Washington, D.C.—American University, Catholic University of America, *George Washington University*, Georgetown University, and Howard University—have formed a Consortium through which they are coordinating the use of their respective facilities. As the arrangement develops, juniors, seniors, and graduate students in approved programs leading to degrees in any one of the universities will increasingly have the opportunity to select from the combined offerings of all five universities the particular courses which best meet their needs.

Participation is limited to campus degree candidates. The following, however, are excluded: freshman and sophomore students, and students in Canon Law, Law, Dentistry, Medicine, and Theology.

Special courses, such as private instruction (as in music or art) or tutorial study and courses in preparation for passing the language requirement, are excluded from the Consortium program. Also excluded are courses offered in Reserve Officer Training Corps programs. *A student may not take courses at another university that are available at his own.*

The student registers and pays at his own university for all Consortium courses. There are no refunds for Consortium courses in the summer.

See page 16 for information concerning registration for Consortium courses.

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THE SUMMER SESSIONS

THE PROGRAMS OF THE SUMMER SESSIONS have been planned to meet the needs of full- and part-time students.

During the summer of 1971, Columbian College of Arts and Sciences, the Graduate School of Arts and Sciences, the School of Engineering and Applied Science, the School of Government and Business Administration, the School of Public and International Affairs, and the Division of University Students offer courses in two 5-week sessions, with some graduate seminars and courses extending over an 8-week period. The School of Engineering and Applied Science also offers courses in an 8-week period. The National Law Center offers courses in three sessions, and the School of Education offers courses in a 6-week session and three 3-week workshop sessions.

The time at which each course is offered (session and hours) is stated at the end of the course description.

Admission

APPLICATION FOR ADMISSION OR READMISSION

THE APPLICATION FOR ADMISSION to degree candidacy should be accompanied by a $25 application fee. There is no application fee for the student who is applying for nondegree status in the Division of University Students.

NONDEGREE STATUS

Application for nondegree status in the Division of University Students should be received, with any required credentials, by the Friday before the registration date of the session for which admission is sought (see Calendar, pages 5 and 6).

DEGREE CANDIDACY

Students from secondary schools wishing to begin college as degree candidates, in either the first or second term of the summer session, must submit application and all required credentials prior to March 1.

Undergraduate transfer students from other institutions, applicants for graduate programs, and *readmission applicants* must submit application and required credentials prior to May 1 for the first summer session and June 1 for the second summer session.

Records presented become the property of the University and *cannot* be returned.

APPLICATION FORMS

The tearout postcard form inside the back cover of this catalogue may be used to request the Dean of the Summer Sessions to furnish the appropriate form for admission or readmission to the University for nondegree status or for a degree program. Students who attended the University in the spring semester of 1971 do not need to reapply to attend the Summer Sessions.

THE STUDENT NOT SEEKING A DEGREE

The student not seeking a degree from this University should complete application for admission to the Division of University Students. (See paragraph above.) This nondegree-granting division makes the work of the University available to five types of applicants, in accordance with the following requirements:

1. The student registered for a program leading toward a degree at another institution is admitted to the extent that facilities permit. No transcript of record is required unless the student has been subject to academic or disciplinary action.*

2. The student over 21 years of age who is not working for a degree in this or another institution may be admitted to take courses for which he has adequate preparation, as determined by the department concerned. A transcript of record is not usually required.*

3. Applicants under 21 years of age who have not attended a college or higher institution may be admitted if they meet the entrance requirements of Columbian College of Arts and Sciences (see page 24).

4. Under special conditions, recent secondary school graduates under 21 years of age who have been accepted by a regionally accredited university or college for the fall semester of 1971 may be admitted for the *summer session only* without filing a transcript if they submit a photostatic copy of their letter of unconditional acceptance.

5. Secondary school students applying for admission to the Secondary School Honors Program may be admitted in accordance with the requirements stated on page 37.

THE STUDENT SEEKING A DEGREE

An applicant from a secondary school must

1. Send to his high school principal the high school record form provided by the University, with the request that the completed form be mailed *to the Office of Admissions.*

* For admission to the Division of University Students the student must be in good standing and eligible to continue in the institution last attended during the past calendar year. No student is eligible for admission if he has been suspended within the past calendar year.

2. Request a report of College Entrance Examination Board test scores be sent to the Office of Admissions directly from the Educational Testing Service, Princeton, N.J., or Berkeley, Calif. Every applicant is required to submit scores on the Scholastic Aptitude Test and the English Composition Achievement Test. In addition, an Engineering applicant must take the Mathematics Test (Level I or II).

An applicant who has attended one or more institutions of higher learning must request each registrar to mail to the Office of Admissions a transcript of his record, even though credits were not earned. An honorable dismissal is required from the institution last attended.

The report of the Graduate Record Examination, the Miller Analogies Test, or the Admission Test for Graduate Study in Business, where applicable, should accompany application to graduate degree candidacy.

Registration

A STUDENT MAY NOT REGISTER FOR CLASSES until admission to the University has been approved by the appropriate office.

A student previously registered in this University who was not registered for campus courses during the spring semester preceding this registration must apply for and receive a letter of readmission from the Office of Admissions (undergraduate and nondegree) or appropriate Dean's Office (graduate), before he is eligible for registration.

Registration days and hours are stated in the calendar at the front of this catalogue. All students except those in the National Law Center should report first to the first floor of the University Library, 2023 G Street, N.W., where they will be given materials and detailed information concerning registration procedures. Degree candidates in Law secure their registration packets and instructions at the Office of the Dean of the National Law Center in Stockton Hall.

Registration packets for all students (except those in the National Law Center) registering on June 14 and July 22 will be distributed from the University Library, 2023 G Street, N.W. On all other registration dates (Law excluded), packets will be distributed from the Office of the Registrar, Rice Hall, 2121 I Street, N.W.

Students planning to take courses in the first session and also in other sessions later in the summer may register at the first registration for *all* summer courses. Students who wish to register for the second five-week session, the second session in Law, or the second three-week, the six-week, or the third three-week session in Education may register on the stated registration dates for those sessions or on any earlier summer registration date (see Summer Sessions Calendar, pages 5–6). Tuition for all courses is due and payable in full at the time of registration.

Students expecting to complete requirements for degrees during the Summer Sessions must apply for graduation as a part of registration for the Summer Sessions and pay the appropriate fee.

In special instances, with the permission of the instructor, a person who has been admitted to the University may be registered as an auditor in a class without being required to take active part or to pass examinations. No academic credit will be allowed for such attendance. A student who takes a course as an auditor may not take the same course later for credit.

REGISTRATION BY GW STUDENTS FOR CONSORTIUM COURSES

Students interested in taking courses at any of the four other universities in the Consortium of Universities of the Washington Metropolitan Area, Inc. (see page 9), should consult the program announcements of the other universities. Consortium application forms and instructions are available from the Registrar after the student has obtained his registration packet.

In order to participate in the Consortium program (1) the graduate student must obtain the approval of his adviser and should ascertain from the department of the university where the course is taught whether or not he is eligible for the course and whether there is space in the class, or (2) the undergraduate student must obtain the approval of his adviser and *must* ascertain from the department of the university where the course is taught whether or not he is eligible for the course and whether there is space in the class. Specific inquiries should be addressed to the Registrar.

CHANGES IN PROGRAM OF STUDY

Changes in programs of study may be made only with the permission of the adviser or major professor and the dean or director of the college, school, or division concerned.

Students should consult the deans' offices concerning final dates on which changes in schedule may be made.

Fees and Financial Regulations

THE FOLLOWING FEES have been adopted for the summer of 1971:

Tuition Fees

For each semester hour* (except for work taken by candidates for the degree of Doctor of Juridical Science and all other Doctoral candidates in residence in the University prior to the 1967 Summer Sessions)	$74.00
Doctor of Juridical Science, including the final examination	2,000.00
University Center Fee (charged all students registered on campus†, nonrefundable)	3.50
For each semester hour for which the student registers	

* Candidates for doctoral degrees (except for the degree of Doctor of Juridical Science) in residence in the University prior to the 1967 Summer Sessions may complete their programs under the schedule for payment of tuition fees in effect prior to July 1, 1967. For tuition fee for the degree of Doctor of Juridical Science, see above.

† The maximum charge for any student during the entire Summer Sessions will be $37.50. Students in the College of General Studies are charged the University Center Fee only when registered for courses on campus.

Additional Course Fees

In certain courses additional fees, such as laboratory and material fees, are charged as indicated in the course descriptions. These fees are due with the tuition fee for the course. Breakage of apparatus is charged against the individual student. When breakage is in excess of the normal amount provided for in the laboratory fee, the individual student will be required to pay such additional charges as are determined by the department concerned.

Graduation Fees

Associate in Arts	$10.00
Bachelor's, Master's, Education Specialist, and Doctor's degrees	25.00
Certificate of the Institute for Sino-Soviet Studies, Graduate Certificate in Health Care Administration	25.00
Fee for Binding Master's Thesis	10.00
Fee for Microfilm Service and Printing Abstract of Doctoral Dissertation	60.00

Special Fees

Application fee (degree candidate) nonrefundable	25.00
Application fee, Unclassified Students in the National Law Center, nonrefundable	5.00
Admission tests (when required)	6.00–12.00
Late-registration fee, for failure to register within the designated period	15.00
Late payment fee, charged for failure to make payments when due (see "Payment of Fees," below)	15.00
Financial reinstatement fee, for reinstatement after financial encumbrance for nonpayment of fees (see "Payment of Fees," below)	35.00
Returned check fee, charged a student whose check is returned because of insufficient funds or improper drafting	15.00
For each examination to qualify for advanced standing and for each special examination	5.00
English test for foreign students (when required)	5.00
Laboratory check-out fee, for failure to check out of chemistry laboratory by the date deadline set by the instructor	3.00
National Teacher Examinations fee, for Bachelor of Arts in Education degree candidates	9.00–13.00
Transcript fee, for each transcript of record	1.00

Registration on campus in the University entitles each student to the following University privileges: (1) the services of the Student Career Services Office; (2) the use of the University Library; (3) medical attention described on page 20. These privileges terminate when the student withdraws or is dismissed from the University.

PAYMENT OF FEES

No student is permitted to complete registration or to attend classes until all fees are paid. Fees for each session are due in advance at the time of registration.

Students who fail to make any payment when due will be automatically charged a $15 late payment fee. Accounts which become 30 days past due will be financially encumbered and will be subject to the interest charge of eight per cent per annum. In the event a student's account is financially encumbered, the student forfeits his rights to the use of deferred payment contracts in future semesters, and the Student Accounts Office will notify the Registrar to withhold grades, future registration privileges, transcripts, diplomas, and other academic information until the account is settled financially. Financial settlement will require payment in full of all amounts due the University in addition to a financial reinstatement fee of $35.

Students auditing courses are subject to all fees charged to students registered for credit.

WITHDRAWALS AND REFUNDS

Registrations are for the session, and no refunds or rebates are allowed; this regulation also applies to courses taken through the Consortium of Universities of the Washington Metropolitan Area, Inc. In no case will tuition be refunded because of absence from classes.

Payments apply only to the session for which registration charges are incurred, and in no case will these payments be credited to another session or term.

Students in chemistry who fail to check out of the laboratory on or before the date set by the instructor, unless excused by the instructor, will be charged a $3 check-out fee. A student who drops a course before the end of the session must check out of the laboratory at the next regular laboratory period.

Authorization to withdraw and certification for work done will not be given a student who does not have a clear financial record.

University Regulations

STUDENTS IN THE SUMMER SESSIONS are subject to the University regulations governing students enrolled during the academic year. Degree candidates are referred to the catalogues of the schools in which they are registered. Non-degree students should consult the *Undergraduate and Graduate Catalogue*.

Academic Credit.—The Summer Sessions are an integral part of the University. Academic credit for completed work will be given toward the appropriate degrees in the various colleges and schools of the University in accordance with their separate regulations and requirements.

Residence.—Summer Sessions work may be counted in residence but the candidate for a degree must satisfy the residence requirements of the school or college concerned.

Academic Work Load.—No full-time student may take more than 7 semester hours of work during each 5-week session. No student employed more than 20 hours a week may take more than 4 semester hours of work during each 5-week session.

In the School of Education, 3 semester hours constitutes a full-time program for full-time students in any one of the 3-week workshop sessions, and 6 semester hours represents full-time work in the 6-week session.

In the National Law Center the maximum amount of work that may be taken in each session by a full-time student is 6 semester hours; by an employed student, 4 semester hours.

In the School of Engineering and Applied Science the maximum amount of work that may be taken in a session by a full-time student is 6 semester hours.

The right is reserved by the University to dismiss or exclude any student from the University, or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable to do so.

The right is reserved by the University to make changes in programs without notice whenever circumstances warrant such changes.

The University and its various colleges, schools, and divisions reserve the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

The University is not responsible for the loss of personal property in any University building. A "Lost and Found" office is maintained in the Campus Security Office, Woodhull House, 2033 G Street, N.W.

UNIVERSITY POLICY ON THE RELEASE OF STUDENT INFORMATION

In general, the policy of the University is one of attempting to keep the student's record confidential and out of the hands of those who would use it for other than legitimate reasons. At the same time, the policy must be flexible enough not to hinder the student, the University, or the community in their legitimate endeavors.

No information concerning a student will be released except as noted below:

1. Information such as whether or not the student is currently enrolled; dates of attendance; verification of date and place of birth; degrees earned, if any, date, major field or area of concentration, and honors received; home and local addresses and telephone numbers; school, college, or division of enrollment, and class; verification of signature; name and address of parent or guardian.

2. The issuance of formal transcripts of record to recognized institutions of higher learning; the certification of academic achievement to the various recognized professional associations (law, medicine, engineering, education, etc.).

Additional information will be released only on written authorization from the student, or by court order or subpoena. If a subpoena is served, the student whose record is being subpoenaed will be notified and the subpoena will be referred to the University's legal counsel.

Government investigative agencies have no inherent right to access to student files and records. If expressly requested, properly identified representatives from federal, state, or local government agencies may be given the information listed under No. 1 above.

RECENTLY ESTABLISHED REGULATIONS

An Appendix (pages 97–98) contains regulations recently approved by the University's Board of Trustees.

Student Services and Activities

STUDENT HEALTH SERVICE

The Student Health Service is an outpatient clinic designed to assist all registered students with their health needs while attending the University. This service, located at 935 22nd Street, N.W. (in the University Clinic building), assists with health conditions and medical emergencies by advice and treatment, proper referral when necessary, and cooperation with other physicians and medical facilities.

During the academic year, the hours are 9 a.m. to 10 p.m., Monday through Friday, and 9 a.m. to 12 noon on Saturday. The weekday hours during the summer sessions are from 9 a.m. to 9 p.m.; Saturday hours are 9 a.m. to 12 noon. A physician is in attendance during these hours.

For serious illnesses or emergencies that occur when the Student Health Service is closed, students may call the Medical Bureau (223-2200), or go to the Emergency Room of the University Hospital for treatment. Charges for both of these services are solely the responsibility of the student.

Charges for services that are not available through the Student Health Service, such as X-ray and laboratory tests, specialty services, and consultations, etc., must be paid by the student.

The Student Health Service is available only to those students who are currently enrolled in the University. A student who is not currently enrolled, or one who has severed his connection with the University, is ineligible for this service. This service is not available between the last day of examinations for a semester or summer session and the completion of registration for the next semester or summer session.

A student intending to train for an athletic team is required to pass a medical examination. The University is not responsible for injuries received in intercollegiate or intramural games, or in any of the activities of the Department of Physical Education.

THE READING CENTER

The Reading Center offers individual diagnostic and corrective services for all levels: primary, elementary, secondary, and adult. In addition, special reading improvement classes are conducted for high school and college students as well as other adults.

A complete diagnosis includes psychological tests; vision, hearing, dominance, and spelling tests; and various types of reading achievement and aptitude tests. Results are interpreted, and a written report is presented in conference with the parents or the individual.

The special reading improvement classes for high school students, college students, and other adults are offered throughout the year at stated intervals. Emphasis is placed on improvement of vocabulary, speed, comprehension, and study skills. Instruction in spelling is also provided as needed. Mechanical aids such as the tachistoscope, rate accelerator, and controlled reader are available for increasing speed of comprehension.

Fees.—The fee for individual diagnosis is $60; for individual instruction, $8 a lesson; for semi-individual instruction, $6 a lesson; for instruction in small groups with common reading difficulties, $5 a lesson. Fees are reduced for

full-time students currently enrolled in George Washington University. All fees are payable in advance at the Office of the Cashier.

UNIVERSITY COUNSELING CENTER

The George Washington University Counseling Center provides services designed to assist students with educational, social, and personal problems. These services help the individual to evaluate his educational, personal, and social life.

Services of the center include behavior therapy; individual and group counseling; diagnosis of academic difficulties; and the provision of remedial measures such as study habits instruction (individual and group), programmed instruction, and the referral of students seeking help to qualified outside agencies.

The Counseling Center also provides special assessment services in cooperation with the School of Engineering and Applied Science, the Office of Admissions, and other educational institutions.

Fees.—For students who are currently registered as degree candidates in the University, the fee is $20; for students currently enrolled in the University but not as degree candidates, $60; for graduates of the University, $60; for community clients, $85. Fees for specialized testing are dependent upon the services involved. All fees are payable at the Counseling Center Office.

THE SPEECH AND HEARING CLINIC

The Speech and Hearing Clinic offers diagnostic and remedial work for children and adults with such communication difficulties as stuttering, lisping, cleft palate speech, cerebral-palsied speech, and voice, articulatory, and hearing problems. Diagnostic and remedial work is also available for persons with nonstandard language usage due to such conditions as hearing loss, brain damage, mental retardation, and environmental factors.

Fees.—The fee for an initial evaluation is $20. Fees for additional specialized testing are dependent on the testing involved. The fees for individual speech or hearing therapy range from $3 to $10 a session. Fees are reduced for full-time students enrolled in the University and for persons receiving group therapy. Fees are payable at the Office of the Cashier.

VETERANS EDUCATION

The Office of the Registrar assists students entitled to educational benefits as veterans or war orphans with any problems which may arise concerning their benefits. This Office also processes certification of enrollment and attendance to the Veterans Administration so that monthly allowances will be paid.

When feasible, students entitled to benefits as veterans or war orphans should consult the Office of the Registrar prior to submitting application to the Veterans Administration. All such students should obtain the instruction sheet issued by the Office of the Registrar, which sets forth requirements to be fulfilled before certification of enrollment can be made to the Veterans Administration, and which includes other information of general interest.

The Veterans Administration is at 2033 M Street, N.W., Washington, D.C. 20421.

RESIDENCE HALL

Men, women, and married couples (no children) will be housed in Thurston Residence Hall, 1900 F Street, N.W. This is a modern, air-conditioned building.

Admission to the University does not include a room reservation. A separate application for a room should be made well in advance.

RESIDENCE HALL RATES FOR 1971 SUMMER SESSIONS*

	Multiple Occupancy	*Single Occupancy*
Monthly	$100.00	$140.00
Weekly	25.00	35.00
Daily	5.00	7.00
Each regular 5-week Session	125.00	175.00

Residence hall payments are due and payable in advance. A student who fails to meet payment is subject to automatic suspension.

Forms for application, together with detailed information, may be obtained from the Director of Housing.

Information concerning off-campus housing near the University is available at the Office of the Director of Housing.

UNIVERSITY CENTER

The term University Center encompasses a building, an organization, and a program. The building is the University's center for community life. It is the physical instrument for implementation of the programs and objectives of the organization.

The organization, composed of students, faculty, administrators, and alumni, provides an informal education medium for individual and group activities adapted to the leisure-time interests and needs of the University community. It also provides training for those directly involved in management and programming for the Center.

The primary purpose of the George Washington University Center is the continuing development of a broad cultural, intellectual, social, and recreational program. Its secondary purpose is the provision of its various services and facilities to the campus community for the development of community life.

The Center houses a wide range of facilities to serve the needs of the campus, including dining rooms and a rathskeller, a bookstore, lounges and study areas, a theater, bowling lanes and a billiard room, a University Club, student organization offices and workrooms, meeting and conference rooms, an information center, music listening rooms, social areas, shower and dressing rooms, lockers, and parking accommodations.

STUDENT AND ALUMNI CAREER SERVICES OFFICE

The Student and Alumni Career Services Office provides assistance to degree candidates and alumni seeking full-time, part-time, temporary, or permanent employment.

The Office maintains a registry of positions available in many fields, both locally and nationally, and refers qualified applicants for consideration. The

* The rates include linen service. Rates shown are subject to change.

Office administers the On-Campus Industrial and Government Recruitment Interview Program for seniors and graduate students, in which private companies, government agencies, service organizations, public school systems, and universities participate. The Office also handles the referral and placement functions of the on-campus College Work-Study Program. Prospective teachers may establish permanent credentials files in the Student and Alumni Career Services Office. This service includes files for alumni seeking college and university faculty and administrative positions. The Office also provides individual counseling for students and alumni wishing career guidance.

SOCIAL AND RECREATIONAL PROGRAM

The social and recreational program includes many varied activities and scheduled events. In addition to this campus program a great abundance of cultural as well as social and recreational opportunities is available to persons living in the metropolitan area. During the summer the University posts a weekly guide to all these on a bulletin board in the University Center.

THE COLLEGES, SCHOOLS, AND DIVISIONS

INFORMATION CONCERNING SPECIFIC REQUIREMENTS for degrees is omitted from this catalogue. For such information and other pertinent regulations, the student is referred to the catalogue of the school concerned.

COLUMBIAN COLLEGE OF ARTS AND SCIENCES

Incoming liberal arts and science freshmen and all transfer students of less than junior class standing are registered in the lower division of Columbian College of Arts and Sciences. The lower division also provides the first two years of the prelegal and premedical programs; the preprofessional work required for admission to the School of Education, the School of Government and Business Administration, and the School of Public and International Affairs; and a terminal curriculum in Accounting. The lower division is primarily concerned with providing (1) the academic guidance needed by beginning college students and (2) the broad cultural foundations in language and literature, science, and social studies on which major field specialization in the upper division is built.

The upper division of Columbian College offers programs leading to Bachelor's degrees in the liberal arts and sciences.

THE DEGREES

Columbian College offers work leading to the following degrees: Associate in Arts, Bachelor of Arts, and Bachelor of Science. In cooperation with the School of Medicine, Columbian College offers work leading to the combined degrees of Bachelor of Arts and Doctor of Medicine. In cooperation with the Department of Pathology and the University Hospital, Columbian College offers work leading to the degree of Bachelor of Science in Medical Technology. Columbian College grants the following degrees which are administered by the College of General Studies: Bachelor of General Studies; Bachelor of Science in Environmental Health; Bachelor of Science in Geodetic and Cartographic Science; and Bachelor of Science in Oceanography.

ENTRANCE REQUIREMENTS*

Requirements for admission to the freshman class are as follows:

1. An acceptable certificate of graduation from an accredited secondary school, showing at least fifteen units which must include four years of English; at least two years of one foreign language; two years of science, preferably with laboratory instruction; two years of social studies, one of which must be American history; and two years of college preparatory mathematics. It is to be noted that one unit of algebra, or the equivalent, is prerequisite to courses in chemistry and statistics, and that one unit in algebra and one unit in plane geometry, or the equivalent, are prerequisite to courses in mathematics and physics.
2. The principal's statement that the applicant is prepared to undertake college work.
3. College Entrance Examination Board scores, which must be submitted on the Scholastic Aptitude Test and the English Composition Achievement Test.

A person who does not present all of the formal requirements stated above may request the Office of Admissions to present his case to the Columbian College Committee on Admission and Advanced Standing. The Committee may prescribe appropriate tests.

The applicant is responsible for

Sending the report form obtained from the Office of Admissions to his high school principal who will complete the form and forward it directly to the Office of Admissions.

Requesting a report of scores on the Scholastic Aptitude Test and the English Composition Achievement Test to be sent to the Office of Admissions by the Educational Testing Service, 20 Nassau Street, Princeton, N.J. 08540, or 1947 Center Street, Berkeley, Calif. 94704.

MAJOR FIELDS

Curricula leading to the degree of Bachelor of Arts are available in the following major fields:

American Civilization
American Literature
Anthropology
Applied Mathematics
Applied Statistics
Art History and Theory
Biology
Botany
Chemistry
Classical Archeology and Greek
Classical Humanities
Dramatic Art
Economics
English Literature
Fine Arts
French Language and Literature
Geography
Geology
Germanic Languages and Literatures
History
Journalism
Latin
Latin American Studies
Mathematical Statistics
Mathematics
Music:
  Music History and Literature
  Music Theory
  Applied Music
Philosophy
Physics
Political Science
Psychology
Religion
Russian Language and Literature

* Entrance requirements are established by the faculties of the several colleges, schools, and divisions. The Office of Admissions, as agent for the faculties, administers regulations governing admission, registration, and transfer.

Sociology
Spanish American Literature
Spanish Language and Literature
Speech Communication
Speech Pathology and Audiology
Zoology

Curricula leading to the degree of Bachelor of Science are available in the following major fields:

Applied Mathematics
Applied Statistics
Biology
Botany
Chemistry
Geology
Mathematical Statistics
Mathematics
Physics
Zoology

THE GRADUATE SCHOOL OF ARTS AND SCIENCES

The Graduate School offers work leading to the following degrees: Master of Arts, Master of Fine Arts, Master of Music, Master of Science, Master of Science for Teachers, Master of Science in Forensic Science, and Doctor of Philosophy. In cooperation with the School of Medicine, the Graduate School offers work leading to the combined degrees of Master of Science and Doctor of Medicine or Doctor of Philosophy and Doctor of Medicine.

ENTRANCE REQUIREMENTS

The entering graduate student must have an approved Bachelor's degree from an accredited higher institution, an appropriate distribution of courses, and a superior quality of work in the major field.

GRADUATE FIELDS

Subject	Degrees Offered	
I. Humanities		
American Civilization	M.A.	Ph.D.
American Literature	M.A.	Ph.D.
Art:	M.F.A.	
Ceramics		
Design		
Graphics		
Painting		
Sculpture	M.A.	
Art History and Theory	M.F.A.	
Dramatic Art	M.A.	Ph.D.
English Literature	M.A.	Ph.D.
French Language and Literature	M.A.	Ph.D.
Germanic Languages and Literatures	M.A.	
Linguistics	M.A.	
Museology	Mus.M.	
Music:		
Applied Music		
Conducting		
Music Composition		
Music Theory	M.A.	
Musicology		

Philosophy	M.A.	
Religion	M.A.	
Religion and Medical Care	M.A.	
Religious Education	M.A.	
Russian Language and Literature	M.A.	
Spanish American Literature	M.A.	Ph.D.
Spanish Language and Literature	M.A.	Ph.D.

II. Social Sciences

Anthropology	M.A.	
Economics	M.A.	Ph.D.
Geography	M.A.	
History	M.A.	Ph.D.
*International Relations		Ph.D.
Latin American Studies	M.A.	
Political Science	M.A.	Ph.D.
Sociology	M.A.	Ph.D.

III. Physical and Mathematical Sciences

Applied Mathematics	M.A., M.S.	
Applied Statistics	M.S.	
Chemistry	M.S.	Ph.D.
Forensic Science	M.S. in Forens.S.	
Geochemistry	M.S.	Ph.D.
Geology	M.A., M.S.	Ph.D.
Mathematical Statistics	M.A.	Ph.D.
Mathematics	M.A.	Ph.D.
Physics	M.A.	Ph.D.

IV. Biomedical and Related Sciences

Anatomy	M.S.	Ph.D.
Biochemistry	M.S.	Ph.D.
†Biological Sciences	M.S.	Ph.D.
Biophysics		Ph.D.
Genetics	M.S.	Ph.D.
Human Ecology		Ph.D.
Microbiology	M.S.	Ph.D.
Mycology	M.S.	
Pathology	M.S.	Ph.D.
Pharmacology	M.S.	Ph.D.
Physiology	M.S.	Ph.D.
Psychology	M.A.	Ph.D.
Speech Pathology and Audiology	M.A.	

THE NATIONAL LAW CENTER

The National Law Center offers work leading to the degrees of Juris Doctor, Master of Laws, Master of Comparative Law, Master of Comparative Law (American Practice), and Doctor of Juridical Science.

*The School of Public and International Affairs offers a Master of Arts field in International Affairs.

†Biology, Botany, and Zoology.

Forms for application for admission and information concerning course offerings may be obtained from the Office of the Dean of the National Law Center, 720 Twentieth Street, N.W., Washington, D.C. 20006.

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE

The School of Engineering and Applied Science offers courses leading to the degree of Bachelor of Science in the following areas: Civil Engineering, Electrical Engineering (with Computer Science option), Measurement Science, and Mechanical Engineering. Graduate programs lead to the degrees of Master of Science, Master of Engineering Administration, and Doctor of Science.

ENTRANCE REQUIREMENTS FOR THE BACHELOR OF SCIENCE DEGREE

The School admits those applicants who can benefit themselves and society by disciplined intellectual effort in its environment.

Admission is the first selective step in a long series of qualifying steps the student will take in his progress toward professional competence in engineering. It indicates the School's belief that the applicant has at least the minimum preparation and ability to complete the curriculum successfully.

The applicant must be of good character and must have an academic background appropriate for the program of studies contemplated.

Consideration for admission is based on the following:

1. An acceptable certificate of graduation from an accredited high school showing at least fifteen units*;

2. The principal's statement that the applicant is prepared to undertake college work;

3. Scores on the following College Entrance Examination Board tests: the Scholastic Aptitude Test, the English Composition Achievement Test, and a Level I (Standard) or Level II (Intensive) Mathematics Test—Level I preferred.

The qualifications of applicants who, because of unusual circumstances, do not meet the above requirements will be considered by the School, which may prescribe admission tests.

Nine and one-half of the fifteen units required for entrance must be distributed as follows: three in English, two in algebra, one in plane geometry, one-half in plane trigonometry, one in physics or chemistry, and two in one foreign language or history. General science may not be counted in satisfaction of the science requirement but may be counted as an elective unit.

It is recommended that *both* physics and chemistry be studied in high school. A high school course in solid geometry is recommended as a firm foundation for college mathematics.

An applicant must arrange to have sent directly *from his school to the Office of Admissions of the University* the academic record of his first seven terms in secondary school, together with a personal evaluation and recommendation from his principal. This information may be supplied on a form provided by the University or on a standard form used by the secondary school provided all essential information is included.

* A unit represents a year's study in a secondary school subject, including in the aggregate not less than 120 sixty-minute periods of prepared classroom work.

Quantitative Deficiency.—A graduate of an approved high school who lacks not more than two units of the required subjects and who presents fifteen acceptable units may be admitted to a prescribed program which includes courses to make up his deficiencies.

ENTRANCE REQUIREMENTS FOR THE MASTER'S DEGREES

Admission to graduate study toward a Master's degree requires an appropriate Bachelor's degree from a recognized institution and evidence of capacity for productive work in the field selected, as indicated by undergraduate grades, Graduate Record Examination scores, and similar data.

An applicant who has significant deficiencies in preparation may be required to take prescribed undergraduate courses as an unclassified student before being admitted to graduate student status. In some cases, if such deficiencies are minimal, he may be admitted to graduate student status and allowed to take a limited number of graduate courses while completing the undergraduate courses in which he is deficient. In no case may the undergraduate courses thus taken fulfill any part of the requirements for the Master's degree.

ENTRANCE REQUIREMENTS FOR THE DOCTOR'S DEGREE

The applicant must have adequate preparation for advanced study, including a satisfactory Master's degree, or the equivalent, together with acceptable personal qualities and a capacity for creative scholarship. Well in advance of the opening of the semester for which the student seeks admission, he should correspond with and preferably have a personal interview with the Dean or department chairman of his proposed field of study, to discuss the University's facilities for guidance in this field, the applicant's qualifications, and the possibilities of an effective doctoral program.

THE SCHOOL OF EDUCATION

The School of Education prepares teachers, counselors, and administrators for the higher ranges of educational service and offers opportunities to teachers of experience to extend their education. The schedule of courses is arranged to meet the needs of employed students as well as those able to devote full time to their studies. Students pursuing programs involving teacher certification must make provision to student-teach in the fall or spring semester during hours when public schools are in session. The School offers both graduate and undergraduate work.

THE DEGREES

The School of Education offers work leading to the following degrees: Bachelor of Arts in Education, Bachelor of Science in Physical Education, Master of Arts in Education, Master of Arts in Teaching, Education Specialist, and Doctor of Education.

ENTRANCE REQUIREMENTS

For the Bachelor's Degrees.—The satisfactory completion of two years of approved college work, or graduation from an approved two-year college, or the equivalent, is required.

For the Degree of Master of Arts in Education.—Candidates whose undergraduate preparation does not include equivalents of the basic requirements for the degree of Bachelor of Arts in Education must make up deficiencies and may be required to take designated tests.

For the Degree of Master of Arts in Teaching.—To be admitted as a student-intern, an applicant must (1) have a Bachelor's degree from an accredited liberal arts institution, including courses related to the general education requirements for teacher certification; (2) show evidence of interest in children and a sincere desire to teach; (3) submit three written references attesting to quality of academic record and personality; (4) submit a score on the Aptitude Test of the Graduate Record Examination or the Miller Analogies Test; and (5) be interviewed by the University Selection Committee, or under arrangements specified by the Committee and approved by the Dean of the School of Education.

For the Degree of Education Specialist.—The degree of Master of Arts in Education from this University, or the equivalent; a satisfactory score on the Miller Analogies Test or the Graduate Record Examination; and two years of successful pertinent experience are required. Each applicant must be interviewed and recommended by a staff member of the School of Education or by a representative in the candidate's locality appointed by the Dean.

For the Degree of Doctor of Education.—The applicant must have adequate preparation for advanced study, including graduate work in fields prerequisite to his objective equivalent to that required for the degree of Master of Arts in Education at this University, at least three years of successful pertinent educational experience, acceptable personal qualities, and capacity for creative scholarship and effective leadership.

THE SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION

The School of Government and Business Administration offers work leading to the following degrees: (1) Bachelor of Business Administration with a major in Accounting, Business Administration, Business and Economic Statistics, or International Business; (2) Master of Arts in Government in the fields of Business and Economic Statistics, Personnel Administration, Public Administration, or Urban and Regional Planning; (3) Master of Arts in Health Care Administration; (4) Master of Business Administration in the fields of Accounting, Business Administration, Health Care Administration, International Business, or Personnel Administration; (5) Master of Public Administration in the fields of Health Care Administration, Personnel Administration, Public Administration, or Urban and Regional Planning; (6) Master of Urban and Regional Planning; (7) Graduate Certificate in Health Care Administration (post-Master's study); (8) Doctor of Business Administration; and (9) Doctor of Public Administration.

ENTRANCE REQUIREMENTS FOR THE BACHELOR'S DEGREE

Bachelor of Business Administration.—The satisfactory completion of the ***Accounting, Business Administration,*** and ***International Business,*** or the ***Business and Economic Statistics*** curriculum in the lower division of Columbian College of Arts and Sciences, or the equivalent, is required.

ENTRANCE REQUIREMENTS FOR THE MASTER'S DEGREES

A Bachelor's degree from an accredited college or university, with a quality-point index of 3.00 (*B* average) in the relevant undergraduate field, is required.

Applicants for admission to all Master's degree programs are required to take either the Admission Test for Graduate Study in Business or the aptitude sections of the Graduate Record Examination, both of which are administered by the Educational Testing Service. Master of Business Administration applicants must submit scores on the Admission Test for Graduate Study in Business; Master of Arts in Government, Master of Arts in Health Care Administration, Master of Public Administration, or Master of Urban and Regional Planning applicants may submit scores on either the Admission Test for Graduate Study in Business or the Graduate Record Examination. Any test scores submitted must have been earned within three years of the date of application.

ENTRANCE REQUIREMENTS FOR THE DOCTOR'S DEGREES

Doctor of Business Administration.—The degree of Master of Business Administration, Master of Arts in an approved field, or the equivalent, together with acceptable personal qualities and a capacity for creative scholarship, is required. Applicants must file results of the Admission Test for Graduate Study in Business administered by the Educational Testing Service.

Doctor of Public Administration.—The degree of Master of Public Administration, Master of Arts in an approved field, or the equivalent, together with acceptable personal qualities and a capacity for creative scholarship, is required. Applicants must file results on either the Admission Test for Graduate Study in Business *or* the aptitude sections of the Graduate Record Examination administered by the Educational Testing Service.

THE SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS

The School of Public and International Affairs offers work leading to the degrees of Bachelor of Arts with a major in International Affairs, Chinese Studies, or Public Affairs; Master of Arts in the field of International Affairs, Public Affairs, Russian Studies, or Science, Technology, and Public Policy; and the Certificate of the Institute for Sino-Soviet Studies.

NTRANCE REQUIREMENTS FOR THE BACHELOR OF ARTS DEGREE

With a major in International Affairs, Chinese Studies, or Public Affairs.—The satisfactory completion of the appropriate curriculum in the lower division f Columbian College of Arts and Sciences, or the equivalent, is required.

NTRANCE REQUIREMENTS FOR THE MASTER OF ARTS DEGREE

Bachelor's degree from an accredited college or university is required. Stuents admitted to candidacy must have attained a *B* average or equivalent in e relevant undergraduate fields.

In the field of International Affairs.—The applicant's undergraduate program ould include background courses corresponding to an undergraduate major international affairs at this University.

In the field of Public Affairs.—An undergraduate major in public affairs, economics, history, or political science, depending on the field of specialization, is quired.

In the field of Russian Studies.—The applicant's undergraduate program should include appropriate background courses in history, political science, and Russian language.

In the field of Science, Technology, and Public Policy.—No particular undergraduate concentration is required. The desirable qualifications are both superior competence in a specific discipline and potential aptitude for cross-disciplinary work.

THE COLLEGE OF GENERAL STUDIES

The College of General Studies administers the off-campus degree programs over which Columbian College of Arts and Sciences, the School of Engineering and Applied Science, the School of Government and Business Administration, and the School of Public and International Affairs have degree-granting authority. The College also offers credit courses in liberal arts, education, and business administration for which there is sufficient demand. Special programs are offered to meet the in-service needs of specified groups. As a community service, a regular program of noncredit courses without entrance requirements is also offered.

ENTRANCE REQUIREMENTS

Off-campus Credit Courses.—A simplified procedure is used for admission and registration in off-campus courses. Transcripts of previous academic work are not required. Registration is restricted to those whose qualifications would indicate that they are able to carry the course successfully. Registration in an off-campus course does not constitute admission to degree candidacy in the University.

Noncredit Courses.—In general, noncredit courses will be open to any individual interested in enrolling. When a noncredit course is organized at the request of some particular agency or group, admission may be restricted to the students recommended by the sponsoring organization. A limit on the size of classes may have to be imposed in order to maintain the quality of instruction.

The separate catalogue of the College of General Studies, available at the College, 706 Twentieth Street, N.W., Washington, D.C. 20006, contains full information concerning programs, courses, entrance and degree requirements, and fees.

THE DIVISION OF UNIVERSITY STUDENTS

The Division of University Students makes the work of the University, in its several colleges and schools, accessible to five types of students who are not working toward a degree in this University (see page 14).

SPECIAL PROGRAMS AND WORKSHOPS

THE SUMMER SESSIONS is pleased to announce a carefully planned group of special programs and workshops devised to serve a variety of student needs and to utilize resources which are uniquely present at the University and in the Nation's Capital. These programs, which are described below, have been developed in many areas. They all have a strong academic orientation and will be taught by the regular faculty of the University or distinguished visitors from other institutions.

Dance Workshop

UNE 14 TO JULY 2*

HE DEPARTMENT OF PHYSICAL EDUCATION is offering a three-week Modern ance Workshop under the direction of Professor Elizabeth Burtner. Adnced courses will be taught by a guest-artist teacher and assistant. At the nclusion of the workshop, student compositions and repertory will be preted in the University's theater. This coeducational program is open both to aduate and undergraduate students with previous experience in dance techque and a background in dance composition. From 1 to 3 semester hours credit may be earned, or courses may be audited. Graduate credit in the ogram may be arranged.

Additional information may be obtained from Professor Elizabeth Burtner, ilding J, George Washington University.

YSICAL EDUCATION

57 Dance Technique I (1)
Intermediate technique in modern dance. MTWThF 9–10:30 am.

58 Dance Technique II (1)
Advanced technique in modern dance. MTWThF 9–10:30 am.

ons begin on the day of registration.

110 **Dance Composition II** (1)

Advanced problems in composition. May be repeated three times for credit. MTWThF 11 am–12:30 pm.

120 **Repertory** (1)

Study and performance of dance works. Admission by permission of instructor. May be repeated three times for credit. MTWThF 2–3:30 pm.

Forensics Workshops for High School Teachers

THE DEPARTMENT OF SPEECH AND DRAMA, in cooperation with the Georgetown University Summer Forensics Institute, will offer three workshops in forensics for high school teachers, under the direction of Professor Herbert L. James of Dartmouth College and Associate Professor William M. Reynolds of George Washington University. The first two workshops will focus on techniques and methods of training the student advocate; the third will explore in depth the 1971–72 National High School questions. These workshops are designed to meet the needs of inexperienced coaches as well as those of more experienced teachers. Opportunity will be provided to observe and practice-teach in the Georgetown Institute. Co-founders and present co-directors of the highly successful Georgetown Institute, Professors James and Reynolds are nationally prominent in the fields of speech and debate.

The first two workshops may be taken for credit as Sp&D 123 and 124, or in a noncredit status. The third workshop is noncredit only. A descriptive brochure is available by writing to Professor George F. Henigan, Chairman, Department of Speech and Drama, George Washington University. (Students wishing to enroll for credit should also request an Application for Admission form.)

JUNE 21 TO JULY 9

SPEECH AND DRAMA

124 **Training the Student Advocate: Debate** (3)

In-depth investigation into the theory and practice of coaching high school debate with special attention to preparing students for competition. MTWThF 9:40 am–12:30 pm.

JULY 12 TO JULY 23

SPEECH AND DRAMA

123 **Training the Student Advocate: Special Events** (2)

Intensive study in the techniques and methods of preparing students for responsible speaking in public or contests. Workshop emphasizes the logical, motivational, and ethical demands of oratory, extempore and interpretative speaking, and student congress. MTWThF 9:40 am–12:30 pm.

NONCREDIT WORKSHOPS

Students electing noncredit status will register in the Department of Speech and Drama and pay the fees indicated (which include University Center fee) directly to the Department. Admission to the University is not required.

JUNE 21 TO JULY 9

Training the Student Advocate: Debate

In-depth investigation into the theory and practice of coaching high school debate with special attention on preparing students for competition. Fee, $175.50. MTWThF 9:40 am–12:30 pm.

JULY 12 TO JULY 23

Training the Student Advocate: Special Events

Intensive study in the techniques and methods of preparing students for responsible speaking in public or contests. Workshop emphasizes the logical, motivational, and ethical demands of oratory, extempore and interpretative speaking, and student congress. Fee, $117. MTWThF 9:40 am–12:30 pm.

AUGUST 2 TO AUGUST 10

Workshop on the National High School Proposition

Comprehensive study of bibliography, analysis, and casing, utilizing the unique research facilities of the nation's capital—libraries, government agencies, and independent research organizations in addition to lectures on the topic by outstanding authorities in the field. Special individual work in developing approaches and cases for use in the Fall of 1971. Fee, $80. MTWThF 9:40 am–12:30 pm.

Russian-East Asian Studies

THE INSTITUTE FOR SINO-SOVIET STUDIES is offering a program of related courses focused on Russia, Eastern Europe, and East Asia. These courses are broad enough to have general appeal as electives for the liberal arts student and sufficiently specific to have vocational utility for the teacher of social studies. Regular faculty members will offer ten courses in this program, seven in the first session and three in the second. Each course carries 3 semester hours of credit. Students majoring in Political Science should consult with their advisers before registering for this work.

The following faculty will staff the courses in this program:

Franz Michael, *Professor of International Affairs and Far Eastern History*
Andrew Gyorgy, *Professor of Political Science and International Affairs*
Harold C. Hinton, *Professor of Political Science and International Affairs*
William R. Johnson, *Associate Professor of History*
Charles F. Elliott, *Associate Professor of Political Science and International Affairs*
Richard C. Thornton, *Associate Professor of History*
Carl A. Linden, *Adjunct Associate Professor of International Affairs*

FIRST SESSION—JUNE 14 TO JULY 21

HISTORY

188 **History of Chinese Communism** (3) — Thornton
Survey of the leadership, ideology, structure, and operation of the Communist Party of China from its founding to the present. MTWThF 11:10 am–12:30 pm.

387 **Readings in the History of Sino-Soviet Relations** (3) — Thornton
MWF 1:10–3 pm.

POLITICAL SCIENCE

101 **Far East in the Modern World** (3) — Michael
General character of Far Eastern societies and their response to the impact of America, Europe, and Russia; American policy in Far East and influence of world communism. MTWThF 8:10–9:30 am.

160 **Modern Communist Ideologies** (3) — Elliott
Intensive study of 20th century communism; emphasis on its antecedents and possible evolution. Backgrounds, careers, and ideas of leading communist figures: Marx, Lenin, Stalin, Khrushchev, and Mao. MTWThF 4:10–5:30 pm.

•161 **Soviet Government and Politics** (3) — Linden
Analysis of influences in the formation of the Soviet system under Lenin, Stalin, and Khrushchev; the Soviet Communist Party; government and mass organizations; selected aspects of economic, cultural, social, and foreign policy. MTWTh 7:35–9:15 pm.

163 **Soviet Foreign Policy** (3) — Elliott
Relations with United States, Third World, China; international communism; disarmament policy; instruments of foreign policy; interrelationships of domestic and foreign policies; ideology and foreign policy. MTWTh 5:45–7:25 pm.

194 **Governments of China and Japan** (3) — Hinton
Institutions and processes of government in contemporary China and Japan, with some historical background. Attention to ideological forces. Students who have received credit for P Sc 162 cannot receive credit for P Sc 194. MTWThF 9:40–11 am.

SECOND SESSION—JULY 23 TO AUGUST 28

HISTORY

187 **History of Modern China** (3) — Johnson
China since 1840, particular attention to political developments. MT WThF 1:10–2:30 pm.

• P Sc 112, 115, and 161 are related in their subject matter, and credit for only one of the three may be applied toward a degree.

396 **Readings in Modern Far Eastern History** (3) Johnson
MWF 6:10–8 pm.

POLITICAL SCIENCE

*115 **Government and Politics in Eastern Europe** (3) Gyorgy
Study of the contemporary social and ethnic structures, governmental systems, and international position of the Eastern European satellites. Emphasis on the post-World War II political evolution and present status of Soviet satellite nations. MTWThF 4:10–5:30 pm.

Secondary School Honors Program

THE OUTSTANDING SECONDARY SCHOOL STUDENT who wishes to enrich his academic background and participate in a stimulating introduction to college work s encouraged to seek admission to George Washington University's Secondary chool Honors Program. The Honors Student is enrolled in regular college ourses appropriate to his level of study, his background, and his aptitude as etermined through consultation with his high school counselors and advisers t the University.

Since dormitory life is a vital part of the stimulating academic and cultural tmosphere of the campus and community, Honors Students are allowed to ve in Thurston Hall, a modern, air-conditioned residence dormitory. Students om the immediate metropolitan area may commute, but they are encouraged reside in the dormitory. Honors Students living in the dormitory are supersed by well-trained resident counselors. A varied extracurricular program ocusing upon the unique location of the University in the Nation's Capital has een planned to complement both the academic and social life of the campus.

Credit earned in the Program is applicable toward a degree at George Washgton University should the student later matriculate here. The transfer of edit elsewhere depends upon the policies of the individual school to which the udent might later apply.

All students admitted to the Program are appointed Scholars in the Second- School Honors Program and receive scholarships for a five-week session. esident students pay only $445, covering full tuition, board, and room. Comuting students receive a $77.50 scholarship for each 3- or 4-hour course. aboratory fees and cost of books are not included in these scholarships. The ogram is designed to include a normal summer session of two courses.

Since the Honors Program is limited to 120 secondary school students, adssion is competitive. A transcript of the applicant's grades to date, available t scores, and evidence of emotional and intellectual maturity are criteria for mission.

Application forms and further information may be obtained from Miss Jean Gladding, Director of the Secondary School Honors Program, Division of iversity Students, George Washington University, Washington, D.C. 20006. No applications will be considered after April 30.

Sc 112, 115, and 161 are related in their subject matter, and credit for only one of the three be applied toward a degree

Summer Institute in Israel

A SEVEN-WEEK PROGRAM—JULY–AUGUST

A SPECIAL PROGRAM IN ISRAEL involves the study of the role which the geography, culture, and history of Israel have played in the growth and development of Judaism, Christianity, and Islam. Special attention is given to the contributions of archeology, historical geography, history, and theology to the understanding of these religions. Lectures by the instructors and guest lecturers are held at the Hebrew University of Israel. Field trips provide opportunity for study on historical sites. Instructors are Professor Robert G. Jones and Assistant Professorial Lecturer Martin S. Halpern.

Additional information may be obtained from Professor Robert G. Jones, Chairman, Department of Religion, George Washington University, Washington, D.C. 20006.

RELIGION

137 **The Land of Israel and the Growth of the Western Religions** (6) — Jones, Halpern

Summer Institute in Speech Pathology and Audiology

JUNE 21 TO JULY 23

THE SPEECH PATHOLOGY AND AUDIOLOGY section of the Department of Speech and Drama is offering a five-week Institute which will consider specific communications problems of the school-age child. The Institute will be divided into two courses of study in Speech Pathology and two in Audiology, running concurrently. The content of these graduate-level courses is designed to enhance the knowledge of professionals in the field of communication disorders by lectures, discussions, and demonstrations of current practices and procedures. Each course will be supplemented with lectures and demonstrations by three nationally known authorities who will discuss a particular phase of the course content. A student may earn up to six semester hours of graduate credit during this Institute. He may elect to take all six hours in one discipline, or three in each. A prerequisite of three semester hours in the clinical management of speech and/or language disorders is required of those registering for the Speech Pathology course work; and three semester hours of basic principles and procedures in Audiology is required of those registering for the Audiology course work.

The following faculty will staff the courses in this program:

Lloyd S. Bowling, Sr., *Associate Professor of Speech and Hearing*

Joan R. Regnell, *Assistant Professor of Speech*

Joseph P. Fox, *Assistant Professor of Speech*

Diane M. Brewer, *Assistant Professor of Speech*

A descriptive brochure is available upon request from Lloyd S. Bowling, Director, Summer Institute in Speech Pathology and Audiology, Department of Speech and Drama, George Washington University, Washington, D.C. 20006

SPEECH AND DRAMA

277 **Advanced Clinical Procedures in Speech and Hearing** (3) Regnell

Language therapy for school children. Study of speech and language evaluation and therapy procedures in public schools based on modern linguistics concepts. Video-taped demonstrations. MTWTh 1–2:40 pm.

281 **Advanced Clinical Audiology (3)** Bowling

Principles and methods underlying assessment of auditory disorders; emphasis on bone conduction, masking, and speech intelligibility. Clinical implications, tests, demonstration, and practicum. Laboratory fee, $7.50. MTWTh 11:10 am–12:50 pm.

291 **Seminar: Speech Pathology** (3) Fox

A psycholinguistic model for speech and language disorders. Presentation of a psycholinguistic model of communication based on transformational generative grammar theory and its application to the study of normal and abnormal speech and language behavior in children. May be repeated for credit. MTWTh 9:20–11 am.

292 **Seminar: Audiology** (3) Brewer

Principles and methods underlying identification and assessment of auditory disorders commonly found in hearing-handicapped school children. Methods for speech and language development, speech reading and auditory training of this age group. Video-taped demonstrations. May be repeated for credit. MTWTh 2:50–4:30 pm.

Urban Ecology Workshop

FIRST SESSION—JUNE 14 TO JULY 21

THE ENVIRONMENTAL CRISIS in the Washington Metropolitan Area is the subject of this interdisciplinary workshop. Under the direction of faculty members from various disciplines, the workshop is divided into teams which investigate local environmental issues.

The workshop is open to both graduate and undergraduate students who attend three classroom sessions and two field trips each week and may earn 4 semester hours of credit. An extra laboratory session on curricular materials enables elementary and secondary school teachers in the workshop to earn 2 additional semester hours. Students wishing to enroll for graduate credit will be required to do extra work and will need the permission of both their academic dean and the instructor.

Additional information and application forms may be obtained by writing to Roderick French, Associate Director, GW-Washington Project, George Washington University, Washington, D.C. 20006.

EXPERIMENTAL HUMANITIES

196 **Urban Ecology Workshop** (4 or 6)

Legal, scientific, political, and ethical aspects of specific environmental issues in the Washington area. MTWThF as arranged.

COURSES OF INSTRUCTION

EXPLANATION OF COURSE NUMBERS

COLLEGES AND SCHOOLS OTHER THAN ENGINEERING AND APPLIED SCIENCE

First-group courses.—Courses numbered from 1 to 100 are planned for students in the freshman and sophomore years. With the approval of the adviser and the Dean, they may also be taken by juniors and seniors. In certain instances, they may be taken by graduate students to make up undergraduate deficiencies or as prerequisite to advanced courses, but they may not be taken for graduate credit.

Second-group courses.—Courses numbered from 101 to 200 are planned for students in the junior and senior years. They may be taken for graduate credit only upon the approval of the dean and the instructor at the time of registration. Such approval is granted only with the provision that students must complete additional work in order to receive graduate credit.

Third-group courses.—Courses numbered from 201 to 300 (in the Graduate School of Arts and Sciences, the School of Government and Business Administration, and the School of Public and International Affairs), courses numbered 201 to 400 (in the School of Education) are planned primarily for graduate students. They are open, with the approval of the instructor, to qualified seniors; they are not open to other undergraduates.

Fourth-group courses.—Courses numbered 301 to 400 in the Graduate School of Arts and Sciences are limited to graduate students, but they are primarily for doctoral candidates. Courses numbered 301 to 400 in the School of Government and Business Administration are limited to doctoral students. In the School of Education fourth-group courses, numbered 401 to 500, are limited to graduate students with Master's degrees from accredited institutions.

SCHOOL OF ENGINEERING AND APPLIED SCIENCE

Courses numbered from 1 through 199 are planned for undergraduate credit, although certain courses may be taken for graduate credit when arrangements are approved in advance by the instructor and the Dean. Courses numbered 201 to 300 are planned for graduate credit and may in certain instances be taken by qualified undergraduate students. Courses numbered from 301 to 400 are primarily for doctoral students.

SEMESTER HOURS OF CREDIT

The number of semester hours of credit given for the satisfactory completion of a course is in most cases indicated in parentheses after the name of the course.

KEY TO ABBREVIATIONS

The following abbreviations are used in this catalogue for course designations.

Acct	Accounting	**Hist**	History
AmCv	American Civilization	**Jour**	Journalism
Anth	Anthropology	**Mgt**	Management Science
Ap S	Applied Science	**Math**	Mathematics
B Sc	Biological Sciences	**ME**	Mechanical Engineering
B Ad	Business Administration	**Mus**	Music
Chem	Chemistry	**Phil**	Philosophy
Chin	Chinese Language and Literature	**PE**	Physical Education
		Phys	Physics
Clas	Classics	**P Sc**	Political Science
Econ	Economics	**Psyc**	Psychology
Educ	Education	**P Ad**	Public Administration
EE	Electrical Engineering	**Rel**	Religion
E Ad	Engineering Administration	**Slav**	Slavic Languages and Literatures
Engl	English		
Fren	French	**Soc**	Sociology
Geog	Geography and Regional Science	**Span**	Spanish
Geol	Geology	**S Ed**	Special Education
Germ	Germanic Languages and Literatures	**Sp&D**	Speech and Drama
		Stat	Statistics
HCA	Health Care Administration	**U&RP**	Urban and Regional Planning

The Schedule of Classes for the Summer Sessions, which will be available in April at the Office of the Registrar, will contain information about room assignments and instructors for courses.

The University reserves the right to change or withdraw any of the following courses.

Accounting

A. J. Mastro, *Chairman*

1–2 **Introductory Accounting (3–3)**

A basic understanding of accounting information: accounting concepts, procedures, analyses, and reports as an integral part of a broad management information system; the accounting measurement and communication of significant economic and financial data. Prerequisite to Acct 2: Acct 1. Students who have received credit for Acct 115 cannot receive credit for Acct 1–2. First Session: Acct 1—MTWTh 5:45–7:25 pm. Second Session: Acct 2—MTWTh 7:35–9:15 pm.

*115 **Survey of Financial Accounting** (3)

Development, presentation, and interpretation of financial accounting data necessary to the management process. Students who have received credit for Acct 1–2 cannot receive credit for Acct 115. First Session: Section A—MTWTh 5:45–7:25 pm. Second Session: Section C—MTWTh 5:45–7:25 pm.

121 **Intermediate Accounting** (3)

In-depth study of accounting functions and basic theory: acquisition of assets and services, income and equity accounting, preparation and analysis of financial statements. Prerequisite: Acct 1–2. First Session: MTWTh 5:45–7:25 pm.

193 **Business Budgeting** (3)

Principles, techniques, and procedures involved in the development, installation, and operation of a system of budgetary control to aid management. Prerequisite: Acct 1–2. Students who have received credit for Acct 101 cannot receive credit for Acct 193. First Session: MTWTh 7:35–9:15 pm.

†215 **Survey of Managerial Accounting** (3)

Study of the nature, preparation, analysis, and interpretation of accounting reports, primarily from the management point of view. Prerequisite: Acct 1–2 or 115. Students who have received credit for Acct 101 cannot receive credit for Acct 215. Second Session: Section A—MWTh 6:10–8 pm.

299 **Thesis Seminar** (3)

First Session: As arranged.

300 **Thesis Research** (3)

Second Session.

American Civilization

Administered by the American Studies Program, Bernard Mergen, *Director*

71–72 **Introduction to American Civilization** (3–3)

Themes and issues in American civilization since Colonial times, with emphasis on their contemporary importance. Recommended for sophomores who plan to major in American Civilization. First Session: AmCv 71; Second Session: AmCv 72. MTWThF 9:40–11 am.

281 **Seminar: Early American Literature** (3)
(Formerly Seminar: American Colonial Literature)

Same as Engl 281. First Session: as arranged.

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* A special section of this course, Acct 115B, for students in the Navy Graduate Financial Management Program, will be offered June 7 to July 30; hours to be arranged.

† A special section of this course, Acct 215B, for students in the Navy Graduate Financial Management Program, will be offered August 2 to September 3.

295 Independent Studies (arr.)

Limited to Master's candidates. Permission of instructor, in writing, required. Both sessions.

299–300 Thesis Research (3–3)

Both sessions.

398 Advanced Reading and Research (arr.)

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. Both sessions.

399 Dissertation Research (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

Anthropology

R.K. Lewis, *Chairman*

Departmental prerequisite: Anth 1–2 is prerequisite to all other courses in Anthropology except Anth 158 and 162. This prerequisite may be waived by permission of instructor for some courses in the 170 series.

1–2 Introductory Anthropology (3–3)

Anth 1: survey of man's origin, physical evolution, and culture history. Anth 2: survey of the world's cultures, illustrating the principles of cultural behavior. First Session: Anth 1; Second Session: Anth 2. MTWThF 9:40–11 am.

155 Primitive Religion (3)

Conceptions of the supernatural in nonliterate societies. Examination of religious beliefs and practices. Second Session: MTWThF 11:10 am–12:30 pm.

170 Cultures of the Caribbean (3)

Study of the culture history and ways of life of Indian groups of the area during the ethnographic present. First Session: MTWThF 11:10 am–12:30 pm.

185 Latin American Archeology (3)

The culture history of pre-Columbian Mexico and Central America from the Paleo-Indian period through the Spanish Conquest, emphasizing the origin and development of Latin American high civilizations. First Session: MTWThF 9:40–11 am.

295 Research (3)

May be repeated for credit. Both sessions.

299–300 Thesis Research (3–3)

Both sessions.

Art

L.P. Leite, *Chairman*

ART HISTORY AND THEORY

31–32 Survey of Western Art (3–3)

Survey of the arts in the Western world from prehistoric to modern times. A foundation for further study in the history of art. First Session: Art 31—MTWThF 1:10–2:30 pm. Second Session: Art 32—MTWThF 8:10–9:30 am.

71–72 Introduction to the Arts in America (3–3)

Painting, sculpture, and architecture of America, with selected references to crafts and popular arts. Art 71: from Colonial beginnings to the Republican Age. Art 72: from early 19th century to the present. First Session: Art 71; Second Session: Art 72. MTWThF 1:10–2:30 pm.

101 Greek and Roman Architecture (3)

First Session: MTWThF 1:10–2:30 pm.

109 19th Century Art in Europe (3)

Painting and sculpture. First Session: MTWThF 9:40–11 am.

112 Art of Egypt and the Ancient Orient (3)

Study of the art of Mesopotamia, Anatolia, Egypt, and Persia. First Session: MTWThF 11:10 am–12:30 pm.

115 Christian Iconography (3)

Origins and development of Christian symbols and themes from early Christian to modern times. Second Session: MTWThF 11:10 am–12:30 pm.

118 Medieval Art II (3)

Architecture, sculpture, and painting of the Romanesque and Gothic periods. First Session: MTWThF 11:10 am–12:30 pm.

147 Pre-Columbian Art (3)

An introduction to pre-Columbian art in Mexico, Central America, and South America from its beginnings to the Spanish conquest. Examination of architecture, sculpture, ceramics, and painting of the great civilizations of the Olmec, Teotihuacan, Maya, Aztec, Chavín, Mochica, and Inca. First Session: MTWTh 7:35–9:15 pm.

149 19th Century American Sculpture (3)

First Session: MTWThF 9:40–11 am.

216 Medieval Painting (3)

Painting and the decorative arts. First Session: MTWThF 1:10–2:30 pm.

243 Seminar: American Art (3)

Specific area announced in *Schedule of Classes*. Second Session: MTWThF 4:10–5:30 pm.

FINE ARTS

Unless otherwise indicated, Fine Arts courses taught in University studios carry no material or laboratory fees; students must purchase their own materials. Laboratory and material fees for courses taught at the Corcoran School of Art are stated in the course description and are payable at the School.

Courses designated CSA are taught at the Corcoran School of Art. All other courses are taught in University studios.

Departmental prerequisite: Art 21–22 or permission of Department Chairman is prerequisite to all other studio courses in Art.

Fine Arts Courses numbered 121 through 281 may be repeated for credit with the approval of the Department.

21–22 **Design I: Basic** (3–3)

Fundamental studies of principles and elements of design. Art 21: study of two-dimensional design. Art 22: three-dimensional studies. First Session: Art 21A (CSA) and 22A (CSA)—MTWThF 1–4 pm; Art 21B —MTWThF 4:10–7:10 pm; Art 22B—MTWThF 7:25–9:25 pm.

41–42 **Drawing I** (3–3)

Concepts of drawing: perception, analysis of form, use of media. First Session: Art 41A (CSA) and 42A (CSA)—MTWThF 9–12 am; Art 41B-1 (CSA), 41B-2, and 42B (CSA)—MTWThF 1–4 pm; Art 41C (CSA) and 42C (CSA)—MTWThF 6:30–9:30 pm.

51–52 **Ceramics I** (3–3) CSA

Basic techniques for clay preparation, hand forming, wheel throwing, and the application of slip glazes and vitreous glazes through workshop and illustrated lectures. Laboratory fee: Art 51, $45; Art 52, $45. First Session: Art 51A and 52A—MTWThF 1–4 pm; Art 51B and 52B—MTW ThF 6:30–9:30 pm.

57 **Graphics I** (3)

Exploration of the methods of intaglio and relief printing and other composite processes. First Session: MTWThF 7–10 pm.

61 **Water Color** (3) CSA

Painting and experimentation in transparent and opaque water color. First Session: MTWThF 9–12 am.

65–66 **Painting I** (3–3) CSA

Experimentation with painting. Color theory and analysis. First Session: Art 65A and 66A—MTWThF 9–12 am; Art 65B and 66B—MTW ThF 6:30–9:30 pm.

81–82 **Sculpture I** (3–3) CSA

Three-dimensional design. Basic sculptural techniques; modeling, carving, and construction. Media include wood, clay, stone, plaster. Laboratory fee: Art 81, $20; Art 82, $20. First Session: Art 81 and 82—MTW ThF 9–12 am.

123 **Design III: Individual Problems** (3)

Emphasis on the individual student and the problems and materials that specifically interest him in any area of design. First Session: MTWThF 1–4 pm.

125–26 **Painting II** (3–3) CSA
Concepts of painting. Attitudes, approaches, personal statements. First Session: Art 125A and 126A—MTWThF 1–4 pm; Art 125B and 126B—MTWThF 6:30–9:30 pm.

127–28 **Painting III** (3–3) CSA
Exploration of problems in developing a personal visual imagery. First Session: Art 127A and 128A—MTWThF 1–4 pm; Art 127B and 128B—MTWThF 6:30–9:30 pm.

131–32 **Ceramics II** (3–3) CSA
Basic techniques in clay and glaze formation, advanced wheel throwing and hand forming. Laboratory fee: Art 131, $45; Art 132, $45. First Session: Art 131A and 132A—MTWThF 1–4 pm; Art 131B and 132B—MTWThF 6:30–9:30 pm.

137 **Workshop in Materials, Methods, and Techniques** (3)
Drawing in charcoal, crayon, and pen; painting and preparation of grounds in tempera, encaustic, fresco buono, oil, watercolor, polymer, and mixed techniques; graphic techniques in woodcut, engraving, etching; modeling in clay and carving in wood and stone; mosaic. Materials and model fee, $2. Second Session: MTWThF 1–4 pm.

143–44 **Serigraphy** (3–3)
Advanced problems in serigraphy; emphasis on its aesthetic possibilities. Prerequisite: Art 57–58. First Session: Art 143—MTWThF 9–12 am; Art 144—MTWThF 1–4 pm.

153 **Graphics II** (3)
Advanced relief, intaglio, and other composite processes. Prerequisite: Art 57–58. Second Session: MTWThF 9–12 am.

157–58 **Graphics III** (3–3)
Exploration of combined techniques and mixed media. Prerequisite: Art 153–54. First Session: Art 157A (CSA) and 158 (CSA)—MTWThF 9–12 am. Second Session: 157B—MTWThF 1–4 pm.

159–60 **Drawing II** (3–3) CSA
Development of drawing. Individual study, application and extensions of drawing. First Session: Art 159 and 160—MTWThF 6:30–9:30 pm.

161 **Fundamentals of Photography** (3) CSA
Study of the fundamental techniques of photography; emphasis on creative expression. Laboratory fee, $25. First Session: MTWThF 1–4 pm.

179–80 **Sculpture II** (3–3) CSA
Concepts of sculpture; new materials and developments. Laboratory fee: Art 179, $20; Art 180, $20. First Session: Art 179 and 180—MTWThF 9–12 am.

189–90 **Sculpture III** (3–3) CSA
Advanced study concentrating on relevance of scale and media. Relationship of sculpture to the environment. Laboratory fee: Art 189, $20; Art 190, $20. First Session: Art 189 and 190—MTWThF 9–12 am

191 **Advanced Photography** (3) CSA

Advanced problems in photography: emphasis on creative expression and individual development. Laboratory fee, $25. First Session: MTWThF 9–12 am.

231 **Design IV** (3)

New media and techniques in three-dimensional design. First Session: MTWThF 9–12 am.

265–66 **Painting IV** (3–3) CSA

Creative painting: students encouraged to work on independent projects as well as assigned problems. First Session: Art 265A and 266A—MTWThF 1–4 pm; Art 265B and 266B—MTWThF 6:30–9:30 pm.

275 **Painting V** (3)

Second Session: MTWThF 9–12 am.

279–80 **Sculpture IV** (3–3) CSA

Laboratory fee: Art 279, $20; Art 280, $20. First Session: Art 279 and 280—MTWThF 9–12 am.

281 **Sculpture V** (3) CSA

Laboratory fee, $20. First Session: MTWThF 9–12 am.

iological Sciences

H. Desmond, *Chairman*

epartmental prerequisite: B Sc 11–12 or equivalent is prerequisite to all sec-d-group courses in Biology, Botany, and Zoology, except by permission of e instructor.

3–4 **Introductory Biology for Nonscience Majors** (3–3)

Survey of biological principles: emphasis on man as a functional organism in his environment. Material fee, $12 each session. First Session: B Sc 3; Second Session: B Sc 4. MTW 6–9 pm; Th 6–7 pm.

11–12 **Introductory Biology for Science Majors** (4–4)

Biological principles and problems designed to furnish a base for advanced studies in biology and related sciences. Material fee, $15 each session. First Session: B Sc 11; Second Session: B Sc 12. MTWThF 9:40 am–1 pm.

127 **Genetics** (4)

Introductory course. Basic aspects of transmission of genetic traits with particular reference to the chemical basis of heredity and gene action. Material fee, $12. First Session: MTWThF 9:40 am–12:30 pm.

145 **Introduction to Vertebrate Embryology** (3)

Origin and early development of the individual, formation of organ systems. Emphasis on the frog, chick, and pig, with reference to the human embryo. Material fee, $12. First Session: MTWThF 6–8:50 pm.

163 **Human Physiology** (4)

Introduction to the function of organ systems of the human body. Material fee, $15. Prerequisite for science majors: B Sc 11–12. Prerequisite for Physical Education majors: B Sc 3–4. Second Session: MTWThF 6–8:50 pm.

171 **Undergraduate Research** (arr.)

Admission by permission of the staff member concerned. May be repeated for credit. Material fee, $15. Both sessions.

295 **Research** (arr.)

Investigation of special problems. May be repeated for credit. Both sessions.

299–300 **Thesis Research** (3–3)

Both sessions.

398 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. Both sessions.

399 **Dissertation Research** (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

Business Administration

H.R. Page, *Chairman*

51 **Introduction to Business** (3)

Structure, activities, and problems of business enterprise; its contribution to the individual and to society; careers in business. First Session: MTWTh 1:10–2:50 pm.

102 **Fundamentals of Management** (3)

Planning, organizing, directing, coordinating, and controlling activities of the administrative unit; evolution of management thinking. Second Session: MTWTh 1:10–2:50 pm.

105 **Personnel Management** (3)

The labor force and labor markets. Industrial personnel and manpower programs, organizations and policy in personnel activities. Second Session: MTWThF 4:10–5:30 pm.

118 **Introduction to Data Processing** (3)

Basic data processing principles and methods. A management-oriented introduction to the fundamentals, potentials, and problems of computer-based data processing as a tool for record-keeping, resource-controlling and decision-making. First Session: MTWTh 4:10–5:50 pm.

131 **Business Finance** (3)

Techniques of the financial manager in analyzing capital requirements and methods of acquiring funds; planning efficient use of capital. Asset management, financial analysis, short-term sources of funds, capital budge

ing, long-term sources of funds, stockholder relationships, long-range planning. Extensive use of problems. Prerequisite: Acct 1–2, Econ 1, Math 30, 31, Stat 51. Second Session: MTWTh 3:10–4:50 pm.

141 **Basic Marketing Management** (3)

Introduction to marketing and marketing management in relation to our total economy and business management, consumer and demand analysis, retailing, wholesaling, major marketing management problems and policies with emphasis on major decision areas and tools. Prerequisite: Econ 1–2. First Session: MTWTh 5:45–7:25 pm.

161 **Commercial Law: Contracts, Sales, Agency, Bailments** (3)

First Session: MTWTh 7:35–9:15 pm.

162 **Commercial Law: Negotiable Instruments, Property, Mortgages** (3)

Second Session: MTWTh 7:35–9:15 pm.

225 **Seminar: Manufacturing Production** (3)

Examination of production technology, including new manufacturing processes, materials, products, equipment, and facilities. Implications of emerging technology in managing the production function. Cases, lectures, and individual student research. Prerequisite: B Ad 181 or permission of instructor. Second Session: MWF 6:10–8 pm.

231 **Financial Decision-making** (3)

Functions and objectives of financial management, asset management, problems of internal financial analysis, rate-of-return analysis, financial forecasting, problems of capital demand and supply. Prerequisite: Acct 115 or equivalent; B Ad 131. First Session: MWF 8:10–10 pm.

233 **International Business Finance** (3)

Case development and analysis of problems in international business finance. Impact of the evolving international payments system on business. Prerequisite: B Ad 131 or equivalent. First Session: MWF 4:10–6 pm.

237 **Investment Analysis** (3)

Risk-reward analysis of security investments including analysis of national economy, industry, company, and market; introduction to portfolio management; heavy emphasis on theory, professional application, and computer methods. Prerequisite: B Ad 131. First Session: MWF 6:10–8 pm.

241 **Advanced Marketing Management** (3)

Marketing management problems and policies in major decision areas of product planning, channels of distribution, advertising, personal selling, sales promotion, pricing, and development of integrated marketing programs. Tools useful in decision-making. Case analysis. Second Session: MWF 6:10–8 pm.

255 **International Trade** (3)

Research, analysis, and discussion of public and private foreign trade institutions; principles and theories of international trade; role of foreign trade and investment in U.S. balance of payments; problems and changing patterns in U.S. trade in the Western Hemisphere. Guest speakers. Second Session: MWTh 6:10–8 pm.

257 Operation of the Multinational Firm (3)

Analysis and discussion of problems in international business by use of the case method, including international market entry and expansion; operating policies, procedures, and problems of multinational companies; developing executives for international business. Prerequisite: advanced Master's degree standing. First Session: MWTh 6:10–8 pm.

259 Comparative Business Management (3)

Primarily for doctoral students; open to Master's candidates with permission of instructor. Comparative analysis of business practices and management systems in different countries and under different economic systems. Special attention to generic characteristics of management and of business enterprises and how these are modified in different environments. Examination of the influence of these factors on the level of economic development, social structure, history, and culture of a country. Emphasis on seminar reports and term papers. Prerequisite: Mgt 201 or equivalent. First Session: MWF 4:10–6 pm.

279 Purchasing and Materials Management (3)

Industrial purchasing and materials management principles and practices. Organization and functions in materials management. Determination of requirements, source selection, buying practices, policies, and ethics. First Session: MWF 6:10–8 pm.

282 Government Contract Administration (3)

Surveillance over performance of contract. Rights and obligations: changes, suspension of work, default, termination for the convenience of the government, inspection, warranties, procedures for the settlement of controversies on government contracts. Second Session: MWF 6:10–8 pm.

284 Procurement Data Management (3)

Technical data and the procurement process; organizational and functional relationships, contract-controlling documentation, patent rights, rights in data, requirements determination and the acquisition of data, federal policies, contractor interests. Configuration management: control of changes. First Session: MWF 4:10–6 pm.

291 Seminar: Business Management (3)

Primarily for doctoral students. Research on various phases of management as practiced in American industry. Second Session: MWF 4:10–6 pm.

298 Readings in Business (3)

Supervised readings in selected fields within business administration. Admission by permission of instructor. May be repeated once for credit. First Session: B Ad 298A—MWF 8:10–10 pm. Second Session: B Ad 298B—as arranged.

299 Thesis Seminar (3)

Examination of thesis standards, research philosophy, and methodology. First Session: MWF 8:10–10 pm.

300 Thesis Research (3)

Second Session.

398 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Business Administration general examination. May be repeated for credit. Both sessions.

399 **Dissertation Research** (arr.)

Limited to Doctor of Business Administration candidates. May be repeated for credit. Both Sessions.

Chemistry

C.R. Naeser, *Chairman*

11–12 **General Chemistry** (4–4)

A year course: credit toward a degree at this University given on completion of Chem 12. Elementary course in general chemistry, including qualitative analysis. Prerequisite: one year of high school algebra. Laboratory fee, $18 each session. First Session: Chem 11; Second Session: Chem 12. MWF 8:10 am–1 pm; TTh 8:10–11:10 am.

22 **Introductory Quantitative Analysis** (4)

Theory and practice of quantitative analysis by classical volumetric and gravimetric methods and introduction to instrumental analysis. Prerequisite: Chem 12. Laboratory fee, $18. First Session: MTWThF 8:10 am–12:30 pm.

51–52 **Organic Chemistry** (3–3)

A year course: credit toward a degree at this University given on completion of Chem 52. Chemistry of the compounds of carbon. Prerequisite: Chem 12 or 16. First Session: Chem 51; Second Session: Chem 52. MTWThF 8:10–9:40 am.

53–54 **Organic Chemistry Laboratory** (1–1)

Laboratory complement of Chem 51–52. Prerequisite or concurrent registration: Chem 51–52. Prerequisite to Chem 54: Chem 53. Laboratory fee, $12 each session. First Session: Chem 53; Second Session: Chem 54. MWF 9:50 am–1 pm.

110 **Introduction to Physical Chemistry** (3)

Topics include chemical thermodynamics, chemical kinetics, electrochemistry, solution chemistry, membrane and phase equilibria, and others. Not open to chemistry majors. May not be taken for credit by students who have received credit for Chem 111–12 or an equivalent course. Prerequisite: Chem 16 or 22; Math 31; Phys 2; or permission of instructor. A 6-week course, June 15 to July 28: MTWThF 6–7 pm.

295 **Research** (arr.)

Research on problems approved by the staff. Open to qualified students with advanced training. May be repeated for credit not to exceed a total of 8 semester hours. Laboratory fee, $7.50 a semester hour. Both sessions.

299–300 **Thesis Research** (3–3)

Laboratory fee, $18 each session. Both sessions.

398 Advanced Reading and Research (ART.)
Limited to students preparing for the Doctor of Philosophy cumulative examinations. May be repeated for credit. Both sessions.

399 Dissertation Research (ART.)
Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

Chinese

Administered by the School of Public and International Affairs, B.M. Sapin, *Dean*

Chung-wen Shih, *Adviser*

5–6 **Beginning Intensive Mandarin Chinese, Levels I–II** (6–6)
Intensive beginners' course in fundamentals of grammar and pronunciation with graded reading and practice in writing. Listening comprehension and oral practice in language laboratory. Prerequisite to Chin 6: Chin 5 or 2. Laboratory fee, $17.50 each session. June 14 to July 16: Chin 5*; July 19 to August 20: Chin 6. Classroom—MTWThF 9–11:45 am, tutorial—MTWThF 12:45–1:35 pm, laboratory—MTWThF 1:45–2:35 pm.

Civil, Mechanical, and Environmental Engineering

A.M. Freudenthal, *Acting Chairman*

EIGHT-WEEK COURSES—JUNE 14 TO AUGUST 6

APPLIED SCIENCE

59 Introductory Analytical Mechanics (4)
Kinematics, statics, and dynamics of a particle, statics and dynamics of systems of particles, kinematics of a rigid body, geometrical and inertial parameters of rigid bodies, statics and dynamics of rigid bodies and beams. Introduction to Lagrangian-Hamiltonian formulations. Prerequisite: Ap S 113; Phys 31. MW 6:10–9:30 pm.

MECHANICAL ENGINEERING

131 Thermodynamics (3)
Fundamental thermodynamic concepts from classical and statistical viewpoints; thermal equilibrium and temperature; the first law of thermodynamics, energy analysis of thermodynamic systems. Approach to equilibrium entropy and second law of thermodynamics, analysis of thermodynamic systems. Prerequisite or concurrent registration: Ap S 59. TTh 6:10–8:40 pm.

* Students register for Chin 6 on June 14.

Classics

J.F. Latimer, *Chairman*

COURSES IN ENGLISH TRANSLATION

105 **Survey of Classical Humanities** (3)

Representative masterpieces of Greek and Roman literature: epic, lyric, dramatic, philosophical, and historical. First Session: MTWThF 9:40–11 am.

108 **Classical Mythology** (3)

Mythology of the Greeks and Romans from the creation of the world: tales of the gods, heroes, and great families that have influenced literature, art, and music. Prerequisite: Engl 1, 2; or equivalent. First Session: MTWThF 11:10 am–12:30 pm.

113 **Greek and Roman Drama** (3)

Selected masterpieces of Greek and Roman tragedy and comedy. Second Session: MTWThF 9:40–11 am.

127 **Legacy of Greece and Rome** (3)

(Replaces Clas 125 The Legacy of Greece (3), and Clas 126 The Legacy of Rome (3))

Study of our classical heritage, with emphasis on literature and art, political institutions, and law and their influence in the Western world. Prerequisite: Clas 71, 72; or Clas 105; or Hist 39; or permission of instructor. Second Session: MTWThF 11:10 am–12:30 pm.

Economics

Henry Solomon, *Chairman*

Departmental prerequisite: Econ 1–2 is prerequisite to all other courses in Economics.

1–2 **Principles of Economics** (3–3)

Survey of the major economic principles, institutions, and problems in contemporary life. Econ 1 is prerequisite to Econ 2. First Session: Econ 1 Section A—MTWThF 9:40–11 am, Section B—MTWTh 5:45–7:25 pm. Second Session: Econ 1 Section C—MTWThF 1:10–2:30 pm; Econ 2 Section A—MTWThF 9:40–11 am, Section B—MTWTh 5:45–7:25 pm.

101 **Intermediate Microeconomic Theory** (3)

Analysis of supply, demand, and pricing. First Session: MTWThF 8:10–9:30 am.

102 **Intermediate Macroeconomic Theory** (3)

Theories of national income determination and growth. First Session: MTWThF 11:10 am–12:30 pm.

121 **Money and Banking** (3)

Nature of money, credit, commercial banking, and the other financial institutions in the U.S. monetary system. Second Session: MTWTh 5:45–7:25 pm.

181–82 **International Economics** (3–3)

Econ 181: fundamentals of the monetary theory and pure theory of international trade. Econ 182: analysis of major contemporary problems including balance of payments, international liquidity, and economic development. First Session: Econ 181—MTWThF 11:10 am–12:30 pm. Second Session: Econ 182—MTWTh 5:45–7:25 pm.

195 **Governmental and Industrial Economics** (3)

Limited to students in the Navy Graduate Financial Management Program. June 7 to July 30.

217–18 **Survey of Economics** (3–3)

For graduate students in fields other than Economics; not open to graduate students in Economics. Econ 217: price theory. Econ 218: income and employment theory. Second Session: Econ 217—MWTh 6:10–8 pm; Econ 218—TThF 9:10–11 am.

299–300 **Thesis Research** (3–3)

First Session: Econ 299–300. Second Session: Econ 300.

*378 **Seminar: Topics in Econometrics** (3)

Limited to graduate students, primarily for doctoral candidates. A research seminar covering current econometric literature and special topics. Admission by permission of instructor. Second Session: MWTh 6:10–8 pm.

390 **Seminar: International Economic Theory** (3)

Limited to graduate students, primarily for doctoral candidates. Examination of recent contributions in this field. First Session: MWTh 6:10–8 pm.

398 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. Both sessions.

399 **Dissertation Research** (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

Education

H.G. Detwiler, *Chairman*

Departmental prerequisite: a degree from an accredited institution is prerequisite to all third-group courses in Education. Adequate professional preparation is prerequisite to all third-group courses in Education except for those courses limited to students in the M.A.T. Program in Elementary Education.

* An interdepartmental course offered by the departments of Economics and Statistics.

See also courses in Physical Education, pages 77–78, and in Special Education, pages 90–92.

FIRST 3-WEEK WORKSHOP SESSION—JUNE 14 TO JULY 2

Classes meet Monday through Friday. Each workshop course requires the full day; concurrent registration for another daytime course is not permitted. June 15 to 18—small group discussions, evening; June 21 to July 2—small group discussion and field work, afternoon.

108 **Human Development, Learning, and Teaching** (3)

Principles of effective teaching based on an understanding of human development and the nature of learning. Prerequisite: Psyc 22. A 6-week course, June 15 to July 23: lecture MW 6:40–9 pm; conference 6–6:40 pm.

112A **Educational Measurement** (3)

Scope, needs, services to students, selection and construction of teacher-made tests, interpretation of tests for evidence purposes. Prerequisite: Educ 108 and 123. June 15 to 18: lecture 3:45–5:45 pm. June 21 to July 2: lecture 10:10–12 am; conference 9:10–10 am.

*116 **Elementary School Social Studies** (3)

Content, methods, materials, and activities essential in the elementary school curriculum. Prerequisite: Educ 108 and 123, or teaching experience. June 15 to 18: lecture 3:45–5:45 pm. June 21 to July 2: lecture 8:10–10 am; conference 10:10–11 am.

207 **Curriculum Materials** (3)

For experienced teachers. Construction of courses of study and classroom teaching aids, with direct application to students' situations. June 15 to 18: lecture 3:45–5:45 pm. June 21 to July 2: lecture 8:10–10 am; conference 10:10–11 am.

219 **Elementary School Classroom Procedures** (3)

Current classroom practices; emphasis on planning, unit teaching, techniques in discipline; individual and group evaluation techniques, resources for learning, providing for individual differences. June 15 to 18: lecture 3:45–5:45 pm. June 21 to July 2: lecture 10:10–12 am; conference 9:10–10 am.

245 **School and Community** (3)

The school as an important member of a team of social agencies that builds the community. June 15 to 18: lecture 3:45–5:45 pm. June 21 to July 2: lecture 10:10–12 am; conference 9:10–10 am.

251 **Foundations of Guidance and Personnel Services** (3)

Introductory survey: definitions, scope, principles, historical background, organization, services, emerging trends, and issues. June 15 to 18: lecture 3:45–5:45 pm. June 21 to July 2: lecture 8:10–10 am; conference 10:10–11 am.

*This course may not be taken by students who have completed or plan to enroll in Educ 111.

255 **Secondary Education** (3)

Current proposals for improvement of secondary education. June 15 to 18: lecture 3:45–5:45 pm. June 21 to July 2: lecture 10:10–12 am; conference 9:10–10 am.

257 **Educational and Occupational Development** (3)

Theories of career development; structure of education, training, and work in the United States; sources, forms, collection, evaluation, and dissemination of educational-occupational information. June 15 to 18: lecture 3:45–5:45 pm. June 21 to July 2: lecture 10:10–12 am; conference 9:10–10 am.

260 **Secondary School Supervision** (3)

For experienced teachers and administrators with two or more years of teaching experience. Review of modern supervisory concepts including practices followed in the operation of the school. June 15 to 18: lecture 3:45–5:45 pm. June 21 to July 2: lecture 10:10–12 am; conference 9:10–10 am.

316 **Curriculum Developments in Elementary School Social Studies** (3)

For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective elementary school social studies curriculum. Admission by permission of instructor. June 15 to 18: lecture 3:45–5:45 pm. June 21 to July 2: lecture 8:10–10 am; conference 10:10–11 am.

336 **Practicum in Reading** (3)

Supervised experience in testing and teaching in the Reading Center. Admission by permission of instructor. A 6-week course, June 15 to July 23.

380 **Sensitivity Training: Laboratory Method** (3)

A sensitivity learning experience in human relations using unstructured group experience, individual feedback, experimentation, and practice. Admission by permission of instructor. June 15 to 25: lecture and laboratory 9:10–12 am and 1:10–5 pm. June 28 to July 2: individual projects as assigned and conference.

Psyc 22A **Introduction to Educational Psychology** (3)

Consideration of individual and group differences, adjustments, and the psychology of learning in relation to education and training. June 15 to 18: lecture 3:45–5:45 pm. June 21 to July 2: lecture 10:10–12 am; conference 9:10–10 am.

SECOND 3-WEEK WORKSHOP SESSION—JULY 6 TO JULY 23

Classes meet Monday through Friday. Concurrent registration for another day-time course is not permitted, because each workshop course requires the full day—lecture and conference in the morning; small group discussion and field work in the afternoon.

*115 **Elementary School Teaching of Reading** (3)

Introduction to methods, techniques, materials, and activities essential to a good elementary school reading program. Prerequisite: Educ 108 and

* This course may not be taken by students who have completed or plan to enroll in Educ 114

123, or teaching experience. Lecture 10:10–12 am; conference 9:10–10 am.

201 **Seminar: International Education** (3)
(Formerly Educ 160)

Survey of foreign educational systems and cultures to develop world-mindedness related to selected foreign countries. Embassy resources will be utilized. Lecture 9:10–11 am; conference 11:10–12 am.

206 **The Curriculum** (3)

For experienced teachers. Curriculum development in subject areas, group consideration of student problems. Lecture 8:10–10 am; conference 10:10–11 am.

223 **Foundations of Reading Instruction** (3)
(Formerly Reading Problems)

Historical and psychological background; evaluation of recent methods, materials, and techniques in teaching reading; demonstrations of diagnostic and teaching techniques. Lecture 10:10–12 am; conference 9:10–10 am.

243 **Human Relations in Education** (3)

Principles and practices in human relations between and among learner, teacher, other school personnel, and parents. Lecture 10:10–12 am; conference 9:10–10 am.

253 **Analysis of the Individual for Purposes of Counseling** (3)

Detailed study of individual analysis and appraisal techniques. Development of systematic case study. Prerequisite: Educ 112 or equivalent. Lecture 10:10–12 am; conference 9:10–10 am.

256 **Secondary Education** (3)

Current problems in each subject-matter field. Lecture 8:10–10 am, conference 10:10–11 am.

285 **Student Activities** (3)

Nature and purposes of selected activities—homeroom, clubs, assemblies, school publications, student council, interscholastic contest; attention to sponsorship, participation, finance, and evaluation. Lecture 10:10–12 am; conference 9:10–10 am.

354 **Counseling of Minority Groups** (3)

Consideration of problems and approaches related to counseling cultural and racial minorities in American society; emphasis on counseling the disadvantaged in urban areas. Lecture 10:10–12 am; conference 9:10–10 am.

357 **Mental Hygiene** (3)

Mental health problems; emphasis on needs of counselors, teachers, and others working with children and adolescents. Lecture 8:10–10 am; conference 10:10–11 am.

375 **Introduction to Student Personnel Work** (3)

Student personnel services in American higher education. Personnel work as an integral part of the college program; introduction to the literature of the field. Lecture 10:10–12 am; conference 9:10–10 am.

SIX-WEEK SESSION—JULY 6 TO AUGUST 13

Enrollees fully employed who register for a course marked with a dagger (†) may not register for another course.

112B **Educational Measurement** (3)
This special section of Educ 112 is limited to students in the M.A.T. Program in Elementary Education. Scope, needs, services to students, selection and construction of teacher-made tests, interpretation of tests for evidence purposes. Prerequisite: Educ 108 and 123. MW 1–3 pm.

†113 **Elementary School Art** (3)
For undergraduates in the elementary school curriculum. Materials and methods. Material fee, $5. TTh 6–9 pm.

†123 **Society and the School** (3)
Historical and social development of education at local, national, and international levels; cooperation of the school with other community agencies; functions of school personnel. TTh 6:40–9 pm; conference 6–6:40 pm.

152 **Curriculum for Early Childhood** (3)
Admission by permission of instructor. TTh 6:40–9 pm; conference 6–6:40 pm.

†217 **Philosophy of Education** (3)
To help students formulate a personal philosophy of education. MW 1–3:20 pm; two conference hours as arranged.

220 **Elementary School Teaching Foundations** (9)
(Formerly Educ 107)
Limited to students in the M.A.T. Program in Elementary Education. A block course, dealing with the content of traditional courses in educational psychology; history of education; human development, learning, and teaching; society and the school; introduction to elementary education. 135 class hours, supplemented by field experience (August 30–September 16). MTWThF 9–12 am; field work—1–4 pm.

†229 **Administration of Elementary Education** (3)
For experienced teachers and administrators. Achieving instructional objectives, organizing and servicing teaching activities, coordinating school and community life. TTh 1–3:20 pm; conference MWF 1–2 pm.

†233 **Audio-visual Education** (3)
Selection, evaluation, and use of audio-visual materials; administrative problems in care, operation, maintenance, and use of such materials and equipment. Material fee, $7. MW 6:40–9 pm; two conference hours as arranged.

†261 **Practicum in Guidance** (3 to 6)
Supervised practical instruction. Prerequisite: graduate work in counseling. Admission by permission of Department Chairman. MTWThF 1:10–3 pm.

†271 **The Teacher and School Administration** (3)
Role of federal, state, and local administrative units; school finance; legal

controls; school plant; public support; improving teaching conditions. TTh 4:10–6 pm; two conference hours as arranged.

†278 **School Law** (3)

Sources and scope of school law; legal rights and responsibilities of teachers, pupils, and taxpayers. Other legal problems of major interest to the group. MW 6:40–9 pm; two conference hours as arranged.

†283 **Higher Education in the United States** (3)

Development, scope, purposes, present status, programs, and trends in higher education in the United States. MW 6:40–9 pm; two conference hours as arranged.

293–94 **Research and Independent Study** (3–3)

Individual research under guidance of a staff member. Program and conferences arranged with an instructor.

†295 **Research Methods and Procedures** (3)

Required of all candidates for graduate degrees in Education. To be taken early in the graduate program. Prerequisite: Educ 112 or equivalent. Section A: TTh 1:10–3:30 pm; two conference hours as arranged. Section B: MW 3:40–6 pm; two conference hours as arranged. Section C: MW 6:40–9 pm; two conference hours as arranged.

†296 **Seminar: Educational Research** (3)

Analysis of scientific approaches to problems in education and evaluation of the application of research techniques. Required of all candidates for the Ed.D. degree. Prerequisite: Educ 295 or equivalent. MW 4:10–6 pm; two conference hours as arranged.

†298 **Seminar: Personnel Administration** (3)

Research: policies, rules and regulations, staff organizations, negotiations. TTh 6:40–9 pm; two conference hours as arranged.

299–300 **Thesis Research** (3–3)

Required of Master of Arts in Education candidates writing Master's theses.

†301 **Data Processing in Education** (3)

Machine accounting and computer technology for counselors, teachers, and administrators. TTh 6:40–9 pm; two conference hours as arranged.

†332 **Curriculum for Early Childhood** (3)

Lecture and field. Language arts, science, mathematics, social studies, and the creative arts, emphasizing adaptation to skills and needs of the young child; review of new programs. TTh 6:40–9 pm; conference 6–6:40 pm.

†373 **The Junior-Community College** (3)

Development, organization, curriculum, role, issues, and problems of the junior-community college. MW 6:40–9 pm; conference 6–6:40 pm.

†390 **Legal Problems in Higher Education** (3)

Investigation of legal problems in higher education related to administration, students, faculty, and academic program. TTh 6:40–9 pm; conference 6–6:40 pm.

THIRD 3-WEEK WORKSHOP SESSION—JULY 26 TO AUGUST 13

Classes meet Monday through Friday. Concurrent registration for another daytime course is not permitted, because each workshop course requires the full day—lecture and conference in the morning; small group discussion and field work or laboratory in the afternoon.

114 **Elementary School Music** (3)
For undergraduates in the elementary school curriculum. Materials and methods. Prerequisite: Psyc 1 and 22. Lecture 10:10–12 am; conference 9:10–10 am.

*117 **Elementary School Science** (3)
Content, methods, materials, and activities essential in the elementary school curriculum. Prerequisite: Educ 108 and 123, or teaching experience. Lecture 8:10–10 am; conference 10:10–11 am.

*128 **Children's Literature** (3)
Newer books for children and the children's classics, contribution of literature to child development, children's original expressions. Lecture 8:10–10 am; conference 10:10–11 am.

208 **Human Development** (3)
Contribution of various disciplines to an understanding of human development throughout the life span; emphasis on practical implications of relevant research. Lecture 8:10–10 am; conference 10:10–11 am.

213 **History of Education** (3)
European backgrounds of American education. Lecture 1:10–3 pm; conference 3:10–4 pm.

216 **Education of Slow-learning Children** (3)
Identification, nature, and needs of slow-learning elementary and junior high school children. Emphasis on diagnosis and treatment of learning difficulties. Lecture 8:10–10 am; conference 10:10–11 am.

231 **Secondary School Classroom Procedures** (3)
Current classroom practices: teacher-pupil planning, group procedures, initiatory and culminating activities, individual and group evaluation techniques, teaching aids, etc.; review of recent literature. Lecture 8:10–10 am; conference 10:10–11 am.

258 **Techniques of Counseling** (3)
Intensive study of educational and psychological processes involved in counseling interviews. Vocational, educational, and personal counseling problems. Prerequisite: 12 semester hours in testing and guidance, including Educ 253 and 257. Lecture 10:10–12 am; conference 9:10–10 am.

272 **The Teacher and School Supervision** (3)
Nature, organization, human relationships, and techniques. Lecture 10:10–12 am; conference 9:10–10 am.

* This course may not be taken by students who have completed or plan to enroll in Educ 111

317 **Curriculum Developments in Elementary School Science** (3)

For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective elementary school science curriculum. Admission by permission of instructor. Lecture 8:10–10 am; conference 10:10–11 am.

376 **Student Personnel Work with College Groups** (3)

Principles and procedures of personnel work with campus groups. Promotion, limitation, and coordination of campus group activities; development of student leadership. Lecture 10:10–12 am; conference 9:10–10 am.

Electrical Engineering and Computer Science

W.K. Kahn, *Chairman*

EIGHT-WEEK COURSES—JUNE 14 TO AUGUST 6

198 **Research** (1 to 3)

Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status.

298 **Research** (arr.)

Research as arranged. May be repeated for credit.

299–300 **Thesis Research** (3–3)

399 **Dissertation Research** (arr.)

Limited to Doctor of Science candidates. May be repeated for credit.

Engineering Administration and Operations Research

H. Marlow, *Chairman*

EIGHT-WEEK COURSES—JUNE 14 TO AUGUST 6

115 **Probabilistic and Statistical Methods in Engineering** (3)

Solution of engineering problems using sets and functions; probability models; distributions and functions; statistical concepts and methods, including hypothesis testing, correlation, and regression. Prerequisite: Math 32. MW 3:10–5:40 pm.

211–12 **Engineering Administration** (3–3)

Comprehensive and systematic study of the administrative process with emphasis on industrial, scientific, and engineering environments. Planning: objectives, prediction, policies, plans and characteristics of plans. Organizing: theory of organization, structure, authority, specialization, delegation, staff and committees. Directing: leadership, managing human and material resources. Controlling: setting standards, evaluating performance, using system feedback data for correction and improvement.
E Ad 211: TTh 6:10–8:40 pm; E Ad 212: MW 3:10–5:40 pm.

269 **Elements of Decision Making and Problem Solving** (3)

History and orientation of operations research; concept of quantitative decision making; decision criteria under certainty, risk, and uncertainty; game theory; utility; the time factor; replacement models. Prerequisite: E Ad 115 or equivalent. MW 6:10–8:40 pm.

270 **Survey of Operations Research Methods** (3)

Basic concepts and techniques of operations research as applied to problems in industrial, governmental, and military decision making. Simulation, Monte Carlo techniques; allocation models including the simplex procedure of linear programming, transportation and assignment models, queuing theory, inventory theory. Prerequisite: E Ad 115 or equivalent. TTh 3:10–5:40 pm.

English

G.E. McCandlish, *Chairman*

Students whose College Board English Composition Achievement Test scores suggest inadequate preparation may be assigned to Engl 1*x* or may be tested in vocabulary, spelling, grammar, standard usage, and writing skill, before placement in either Engl 1*x* or 1. Students whose scores indicate marked superiority will be allowed to waive the Engl 1 requirement.

All students enrolled in curricula leading to Bachelor's degrees in Columbian College (who are required to take one year of English composition and one year of literature in English, Classics, French, German, Italian, Slavic, or Spanish) will follow the sequence of Engl 1 or 1*x*, both semesters of one of the introductory literature courses, and Engl 40.

Engl 2 is the second half of the six-hour composition requirement of students *not* required to follow the Columbian College of Arts and Sciences sequence.

Departmental prerequisite: Engl 1 or 1*x* is prerequisite to all other courses in English. One of the following six-hour courses—Engl 51–52, 71–72, or 91–92; Clas 71–72; Fren 51–52; Germ 51–52; Ital 51–52; Slav 91–92; or Span 51–52—is prerequisite to all second-group courses in English except Engl 115 and Engl 161–62.

ENGLISH COMPOSITION

A **English for Foreign Students** (3)

Reading and writing to assist the foreign student in overcoming deficiencies in the use of English. Special attention to spelling, syntax, grammar, idiom, and vocabulary. First Session: MTWTh 5:45–7:25 pm.

B **English for Foreign Students** (3)

For second-semester foreign students not ready for Engl 1. Writing of expository paragraphs and themes; outlining; reading for comprehension, vocabulary, and style. First Session: MTWTh 7:35–9:15 pm.

1 **English Composition** (3)

Analysis and practice of expository techniques with emphasis on unity, development, organization, and coherence; library research procedure. First Session: MTWThF 9:40–11 am.

2 **English Composition** (3)

For second-semester freshmen not following Columbian College sequence. Readings and practice in expository and argumentative techniques; research practice. Credit not given to students with credit for Engl 40. Prerequisite: Engl 1 or 1*x*. Second Session: MTWThF 9:40–11 am.

40 **English Composition** (3)

Second half of the 6-hour English Composition course required of Columbian College students. Critical analysis and practice in expository and argumentative techniques; research practice. Credit not given to students with credit for Engl 2. Prerequisite: Engl 1 or 1*x* and both semesters of one of the introductory literature courses. Second Session: MTWThF 9:40–11 am.

NGLISH LITERATURE

51–52 **Introduction to English Literature** (3–3)

Historical survey. Prerequisite: Engl 1 or 1*x*. First Session: Engl 51; Second Session: Engl 52. MTWThF 9:40–11 am.

111 **Medieval English Literature—Exclusive of Chaucer** (3)

First Session: MTWTh 5:45–7:25 pm.

127 **Shakespeare** (3)

First Session: As arranged.

129 **The Earlier 17th Century** (3)

Poetry and prose to 1660, exclusive of Milton. First Session: MTW ThF 1:10–2:30 pm.

130 **Milton** (3)

Second Session: MTWThF 9:40–11 am.

133 **The Romantic Movement** (3)

Survey of poetry and prose, 1780–1830. Second Session: MTWThF 1:10–2:30 pm.

229 **Studies in English Literature, 1600–1660** (3)

Chief figures exclusive of Milton. First Session: as arranged.

234 **Studies in the Romantic Movement** (3)

Second Session: MWTh 4:10–6 pm.

ERICAN LITERATURE

71–72 **Introduction to American Literature** (3–3)

Historical survey. Engl 71: from beginnings to the Civil War. Engl 72: from the Civil War to present. Prerequisite: Engl 1 or 1*x*. First Session: Engl 71; Second Session: Engl 72. MTWTh 5:45–7:25 pm.

63–64 **Major American Poets** (3–3)

Advanced critical study of significant writers and movements. Engl 163: from beginnings through the 19th century. Engl 164: the 20th century. First Session: Engl 163; Second Session: Engl 164. MTWThF 11:10 am–12:30 pm.

170 **The American Short Story** (3)
Historical development of the short story in America. Second Session: MTWThF 1:10–2:30 pm.

171 **Major American Writers** (3)
First Session: MTWThF 1:10–2:30 pm.

177 **Contemporary American Literature** (3)
First Session: MTWThF 11:10 am–12:30 pm.

268 **Seminar: American Fiction** (3)
William Faulkner. Second Session: MWF 6:10–8 pm.

281 **Seminar: Early American Literature** (3)
(Formerly Seminar: American Colonial Literature)
Same as AmCv 281. First Session: as arranged.

French

Administered by the Department of Romance Languages and Literatures.
J.F. Burks, *Chairman*

Placement Examination: a standardized placement examination given before registration is required of all entering students who wish to continue in college the language begun in high school. Upon completion of the examination, assignment is made to the appropriate course, with credit assigned on the usual basis.

Departmental prerequisite: Fren 3–4 or 6, or equivalent, is required (Fren 51–52 or 91–92 is recommended) as prerequisite to all second-group courses in French.

1–2 **First-year French** (3–3)
A year course: credit toward a degree at this University given on completion of Fren 2. For beginners. Pronunciation, conversation, grammar, composition, reading of modern French prose. Aural training, oral practice in language laboratory. Laboratory fee, $17.50 a session. First Session: Fren 1; Second Session: Fren 2. Classroom—MTWThF 9:40–11 am, laboratory—MTh 11:10–12 am.

3–4 **Second year French** (3–3)
A year course: credit toward a degree at this University given on completion of Fren 4. Conversation, grammar, composition, reading in modern French prose, introduction to French civilization. Aural training, oral practice in language laboratory. Prerequisite: Fren 1–2, 2y, or two years of high school French. Laboratory fee, $17.50 a session. First Session: Fren 3; Second Session: Fren 4. Classroom—MTWThF 11:10 am–12:30 pm, laboratory—MTh 10:10–11 am.

12 **French Conversation and Composition (Intensive)** (6)
Intensive course which covers material of Fren 9–10. Two class meetings and one laboratory meeting every day. Laboratory fee, $25. First Session: classroom—MTWThF 9:40–11 am and 1:10–2:30 pm, laboratory—MTWThF 9–9:30 am.

49 **French for Graduate Students** (0)

For graduate students preparing for reading examinations. No academic credit. Tuition fee, $222. First Session: MTWThF 6–7:20 pm.

129 **Contemporary French Literature** (3)

First Session: MTWThF 1:10–2:30 pm.

193 **Cours de style** (3)

Advanced grammar, composition, and stylistics. Open to both advanced undergraduate and graduate students. Recommended for majors and teachers of French. First Session: MTWThF 4:10–5:30 pm.

256 **19th Century French Literature** (3)

Topic for summer: Flaubert. First Session: MWTh 4:10–6 pm.

295 **Independent Reading and Research in French Literature** (arr.)

For students preparing for the Master of Arts degree. May be repeated for credit. First Session.

299 **Thesis Research** (3)

First Session.

Geography and Regional Science

M.F. Gordon, *Chairman*

51 **Introduction to Geography** (3)

General survey of the various systematic, physical, and human fields of geography which play a role in the analysis and interpretation of man-environment relationships in both spatial and ecological contexts. Second Session: MTWThF 11:10 am–12:30 pm.

52 **World Regional Patterns** (3)

Emphasis on spatial aspects of man's activities within a world regional framework. First Session: MTWThF 11:10 am–12:30 pm.

141 **Urban Settlement** (3)

Consideration of city sizes; functions and locations within a system of cities; emphasis on the physical and functional internal structure of the city, including residential, commercial, and industrial patterns. Analysis of the changing nature of cities and of resulting urban problems. First Session: MTWThF 11:10 am–12:30 pm.

144 **Environmental Adaptation** (3)

Basic considerations of the man-environment relationship with emphasis on bioclimatological responses, disease ecology, nutritional demands and land capabilities, the creation of micro-environments, environmental perceptual processes as well as diffusion processes. First Session: MTW ThF 1:10–2:30 pm.

145 **Cultural Geography** (3)

Analysis of the relationships between culture and environment; emphasis on spatial and ecological considerations. First Session: MTWThF 9:40–11 am.

146 **World Political Geography** (3)
Analysis of the interrelationships between the political community and the human and physical environment. Second Session: MTWThF 1:10–2:30 pm.

155 **Africa** (3)
First Session: MTWThF 9:40–11 am.

189–90 **Readings in Geography** (arr.)
Both sessions.

295 **Research** (arr.)
Both sessions.

299–300 **Thesis Research** (3–3)
Both sessions.

Geology

Geza Teleki, *Chairman*

1–2 **Introductory Geology** (3–3)
Survey covering the principles of geology. Laboratory fee, $12 each session. First Session: Geol 1; Second Session: Geol 2. MTWTh 9:40 am–1 pm.

103 **Development of Scientific Thought** (3)
Second Session: MTWTh 9:40–11:20 am.

147 **Chemical Geology in the Earth and Ocean Sciences** (3)
Introduction to geochemical and chemical principles involved in the understanding of geological systems, and their application to contemporary problems in oceanology, pollution, and mineral exploration. Laboratory fee, $12. Second Session: MTWTh 9:40 am–12:45 pm.

295 **Research** (arr.)
Research on problems approved by the Staff. Open to qualified students with advanced training. May be repeated for credit. Both sessions

299–300 **Thesis Research** (3–3)
First Session: Geol 299; Second Session: Geol 300.

398 **Advanced Reading and Research** (arr.)
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. Both sessions.

399 **Dissertation Research** (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

Germanic Languages and Literatures

Carl Steiner, *Chairman*

Placement Examination: a standardized examination given before registration is required of all entering students who wish to continue in college the language begun in high school. Upon completion of the examination, assignment is made to the appropriate course, with credit assigned on the usual basis.

1–2 **First-year German** (3–3)

A year course: credit toward a degree at this University given on completion of Germ 2. Essentials of German grammar; translation of easy prose. Aural-oral practice in language laboratory. Laboratory fee, $17.50 each session. First Session: Germ 1; Second Session: Germ 2. Classroom: MTWThF 6–7:20 pm. Laboratory: Section M—MTh 5–5:50 pm; Section N—MTh 7:30–8:20 pm.

3–4 **Second-year German** (3–3)

A year course: credit toward a degree at this University given on completion of Germ 4. Selections from modern German prose; continuation and review of grammar. Aural-oral practice in language laboratory. Laboratory fee, $17.50 each session. Prerequisite: Germ 1–2 or two years of high school German. First Session: Germ 3; Second Session: Germ 4. Classroom: MTWThF 7:35–8:55 pm. Laboratory: Section M—MTh 5–5:50 pm; Section N—MTh 6:30–7:20 pm.

47 **Beginning German for Reading Examination Candidates** (0)

Specifically for graduate students with little or no German who are preparing for reading examinations. No academic credit. Tuition fee, $222. First Session: Section A—MTWTh 5:45–7:25 pm (for majors in the Humanities and Social Sciences); Section B—MTWTh 7:35–9:15 pm (for majors in Mathematics and Natural Sciences).

49 **German Readings for Nonmajor Students** (3)

Primarily for graduate students preparing for reading examinations. Undergraduates admitted with permission of instructor. No academic credit for graduate students. Prerequisite: Germ 4 or Germ 47, or equivalent. Second Session: Section A—MTWTh 5:45–7:25 pm (for majors in the Humanities and Social Sciences); Section B—MTWTh 7:35–9:15 pm (for majors in Mathematics and Natural Sciences).

Health Care Administration

Leon Gintzig, *Chairman*

270 **Research in Health Care Administration** (3)

Field research. Primarily for doctoral candidates; open to other graduate students with consent of instructor. Both sessions.

285 **Readings in Health Care Administration** (3)

Supervised readings in some special areas or subdivisions of health care administration. Primarily for doctoral candidates; open to other students by arrangement. Both sessions.

293 **Hospital Residency I** (3)

First third of the twelve-month residency, beginning June 1 or July 1 of each year, has four major objectives: work experience under a qualified preceptor; periodic seminars with University staff; periodic written progress reports of work accomplished; and a final written report of a major investigation. Sections A, B, C, and D.

296 **Hospital Residency II** (3)

First third of the twelve-month residency, beginning June 1 or July 1 of each year. For selected students who take a second year of residency.

History

R.P. Sharkey, *Chairman*

Departmental prerequisite: Hist 39–40 or 91–92 is prerequisite to courses 108 through 158 and 187 through 196; Hist 71–72, to courses 167 through 185; either Hist 39–40, 71–72, or 91–92, to courses 162 through 166. Prerequisite to Hist 105–6 is either Hist 39–40, 91–92, or a background in a science. Students may waive one or more of the prerequisite courses by passing a departmental waiver examination, by attaining scores of 600 or above on the College Entrance Examination Board Achievement tests, or by good performance on Advanced Placement Examinations.

Prerequisite to all third-group History courses: the appropriate second-group preparation and consent of instructor.

Prerequisite to all fourth-group History courses: the appropriate second-group preparation and consent of instructor. Fourth-group History courses are limited to graduate students; but they are primarily for doctoral candidates.

39–40 **European Civilization in Its World Context** (3–3)

Primarily for freshmen. Hist 39: political, social, economic, and cultural history from ancient times to early modern era. Hist 40: from early modern era to present. Students cannot receive credit for both Hist 39–40 and 91–92. First Session: Hist 39—MTWThF 9:40–11 am; Hist 40A—MTWThF 9:40–11 am. Second Session: Hist 40B—MTWThF 9:40–11 am.

71–72 **Introduction to American History** (3–3)

Primarily for sophomores. Hist 71: political, social, economic, and cultural forces of the United States in their world setting from 1492 to 1861. Hist 72: from 1861 to present. First Session: Hist 71A—MTWThF 1:10–2:30 pm; Hist 72A—MTWThF 1:10–2:30 pm. Second Session: Hist 71B—MTWThF 9:40–11 am; Hist 72B—MTWThF 1:10–2:30 pm.

*127 **Theories of History** (3)

Critiques of philosophies of history: idea of progress, historicism, Hegelian-Marxian dialetic, cyclical, and social-scientific views. Contemporary problems of historical knowledge. First Session: MTWThF 11:10 am–12:30 pm.

* An interdepartmental course offered by the departments of History and Philosophy.

150 **European Diplomatic History since 1890** (3)

The European state system; diplomatic practices and relations since the Congress of Vienna; emphasis on policies and actions of the great powers and their statesmen. Students who have received credit for Hist 157 cannot receive credit for Hist 150. Second Session: MTWThF 1:10–2:30 pm.

175 **U.S. Political History** (3)

To the Civil War. Second Session: MTWThF 9:40–11 am.

182 **U.S. Diplomatic History since 1898** (3)

Tendencies toward isolation, expansion, and collectivism; disputes with foreign countries and their settlement; activities of American secretaries of state and diplomatic agents. First Session: MTWThF 11:10 am–12:30 pm.

184 **Canada and the United States** (3)

Historical background and main trends in the relationship of the two English-speaking peoples of North America. First Session: MTWThF 9:40–11 am.

185 **Representative Americans** (3)

Significant and pivotal personalities in government, business, science, religion, journalism, the arts, and social reform. Second Session: MTW ThF 8:10–9:30 am.

187 **History of Modern China** (3)

Second Session: MTWThF 1:10–2:30 pm. (See Russian-East Asian Studies program, pages 35–37.)

188 **History of Chinese Communism** (3)

First Session: MTWThF 11:10 am–12:30 pm. (See Russian-East Asian Studies program, pages 35–37.)

194 **History of the Modern Near East** (3)

Beginning with Napoleon's invasion of Egypt. Interaction of Europe with western Asia, emphasis on such international issues as the Turkish Straits, Suez, Anglo-French imperialism; Turkish, Balkan, Arab, and Jewish nationalism, and the recent Soviet intrusion into the area. First Session: MTWThF 9:40–11 am.

203–4 **Research Seminar** (3–3)

Prerequisite: Departmental approval. First Session: Hist 203; Second Session: Hist 204.

275 **Research Seminar: U.S. Political History** (3)

Prerequisite: Hist 175–76 or equivalent. Second Session: MWF 11:10 am–1 pm.

286 **Research Seminar: Early American History (1607–1828)** (3)

Prerequisite: Hist 170, 175, or 181; or equivalent. First Session: MWF 1:10–3 pm.

291 **Research Seminar: 20th Century Problems—Era of World War I** (3)

First Session: TTh 11:10 am–2 pm.

293 Research Seminar: the Modern Near East (3)
Prerequisite: Hist 193 or equivalent. Second Session: TTh 3–5:40 pm.

299–300 Thesis Research (3–3)
First Session: Hist 299; Second Session: Hist 300.

372 Readings in American Social History (3)
Second Session: TTh 2:10–5 pm.

387 Readings in the History of Sino-Soviet Relations (3)
First Session: MWF 1:10–3 pm. (See Russian-East Asian Studies program, pages 35–37.)

396 Readings in Modern Far Eastern History (3)
Second Session: MWF 6:10–8 pm. (See Russian-East Asian Studies program, pages 35–37.)

399 Dissertation Research (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

For information concerning the special program in Russian-East Asian Studies, see pages 35–37.

Institute for Sino-Soviet Studies

For information concerning the Russian-East Asian Studies program, see pages 35–37.

Journalism

R.C. Willson, *Chairman*

72 Introduction to Mass Communication (3)
(Formerly Journalism in American Society)
Mass media, problems of contemporary journalism, emphasis on media-government relations. Second Session: MTWThF 11:10 am–12:30 pm.

111 Reporting (3)
Gathering, evaluating, and writing news. Second Session: MTWThF 9:40–11 am.

150 News Coverage in Washington (3)
A survey of the way news is gathered and reported in the Nation's Capital by wire services, newspaper bureaus, and the local dailies. Field trips to major news centers; practice coverage. Second Session: MTWThF 11:10 am–12:30 pm.

Law

A list of courses to be offered during the summer of 1971 at the National Law Center will be available in a Law Center announcement scheduled to be issued during January 1971. Copies of this announcement may be obtained from the National Law Center.

Management Science

L.L. Holland, *Chairman*

***201 Advanced Administrative Management (3)**

Advanced course in administration emphasizing principles and practices common to administrative units of all kinds. First Session: Section A—MWF 4:10–6 pm; Section B—MWF 6:10–8 pm. Second Session: Section C—MWF 6:10–8 pm.

203 Mathematics for Management (3)

Mathematical concepts employed in the solution of management problems. Applications of analytical geometry, functions, elements of calculus, and linear algebra to optimization problems. Prerequisite: algebra. First Session: MWF 4:10–6 pm.

204 Quantitative Factors in Administration (3)

Survey of quantitative techniques used in the solution of management problems. Potentials and limitations of mathematical models and proper areas for their application. Topics include probability, statistical decision theory, linear programming, waiting line, inventory replacement models. First Session: Section A—MWF 6:10–8 pm. Second Session: Section B—MWF 8:10–10 pm.

207 Human Behavior in Organizations (3)

Individual, group, intergroup, and other human behavior and development; application of social science research to administration. Practical applications emphasized. First Session: Section A—TTh 6:30–9:30 pm. Second Session: Section B—MWF 8:10–10 pm.

218 Survey of Data Processing (3)

A management-oriented presentation of the vocabulary, concepts, and trends in computer hardware and software, information systems design and development, organizational impact, and effective management; milestones of the past and current research; computer technology as a rapidly evolving force of major significance in business, government, and industry. Designed to provide a comprehension of information technology necessary for contribution to an organizational data processing effort or as preparation for more advanced study. Prerequisite: Mgt 201, 204, 207; or permission of instructor. Second Session: MWF 6:10–8 pm.

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*Special section of this course, Mgt 201D, for students in the Navy Graduate Financial Management Program, will be offered August 2 to September 3; hours to be arranged.

221 **Management Information Systems Development and Application** (3)

Development of management information systems, integration of data processing in operations of government or business, impact on management organization and decision-making. Case studies. Prerequisite: Mgt 218 or 219, 224; or permission of instructor. First Session: MWF 6:10–8 pm.

222 **Seminar: Advanced Digital Computer Concepts** (3)

Current problems in the design and implementation of computer-based systems. Emphasis on current "state-of-the-art" through discussion with leading experts in the field and analysis of literature. Admission by permission of instructor. Second Session: MWF 8:10–10 pm.

223 **Management of a Data Processing Organization** (3)

Advanced course in information technology, emphasizing principles, practices, and trends in the management of data processing. Unique problems, functions, and requirements of data processing management, stressing executive interaction in decision-making, planning, and evaluative functions. Prerequisite: Mgt 218 and either 219 or 220; or permission of instructor. First Session: MWF 8:10–10 pm.

226 **Managerial Statistics** (3)

Management applications of the theory and techniques of mathematical statistics. Topics include maximum likelihood and other methods of estimation, hypothesis testing, descriptive measures of bivariate distributions, regression and correlation, analysis of time series, econometric models and multiple regression, statistical decision theory, and the revision of probabilities in decision-making. Prerequisite: Mgt 225. First Session: MWF 8:10–10 pm.

228 **Systems Analysis by Simulation** (3)

Methods of systems analysis via computer simulation. Particular attention to inventory models, although queuing systems and management planning models are also covered. Prerequisite: Mgt 225, 226. Second Session: MWF 6:10–8 pm.

Mathematics

Hewitt Kenyon, *Chairman*

3 **College Algebra** (3)

Equivalent to the usual two years of high school algebra with several additional topics. Prerequisite: one year each of high school algebra and high school geometry. First Session: MTWThF 6–7:20 pm.

6 **Plane Trigonometry** (3)

Prerequisite: two years of high school algebra and one year of high school geometry, or Math 3 (or concurrent registration therefor). Second Session: MTWThF 6–7:20 pm.

9 **General Mathematics I** (3)

For students electing Math 9 and 10 as a terminal sequence. Logic, sets, number systems. Prerequisite: two years of high school mathematics

First Session: Section A—MTWThF 9:40–11 am. Second Session: Section B—MTWThF 4:10–5:30 pm.

10 General Mathematics II (3)

Mathematical systems, geometry, and introduction to statistics and probability. Prerequisite: Math 9. Second Session: MTWThF 9:40–11 am.

30 Precalculus (3)

Set theory, inequalities, basic analytic geometry, functions and relations. Polynomial, trigonometric, logarithmic, and exponential functions. Prerequisite: Math 3 and 6; or one and one-half years of high school algebra, one year of high school geometry, and one-half year of high school trigonometry; or equivalent. Prior to registration, new students should take a placement examination in algebra and trigonometry. First Session: Section A—MTWThF 7:35–8:55 pm. Second Session: Section B—MTWThF 9:40–11 am.

31 Calculus of One Variable (3)

Differentiation and integration of algebraic and elementary transcendental functions, with simple applications. Prerequisite: Math 30 or equivalent.* First Session: Section A—MTWThF 9:40–11 am. Second Session: Section B—MTWThF 7:35–8:55 pm.

32 Calculus of Several Variables (3)

Partial derivatives, multiple integrals, infinite series. Prerequisite: Math 31. First Session: Section A—MTWThF 6–7:20 pm. Second Session: Section B—MTWThF 9:40–11 am.

33 Calculus of Vector Functions (3)

Elementary linear algebra, vectors, and matrices. Vector calculus, implicit function theory. Prerequisite: Math 32. Second Session: MTWThF 6–7:20 pm.

34 Introduction to Linear Algebra (3)

Linear functions, solutions of equations, dimension and rank, determinants, eigenvalues, quadratic forms, change of basis. Prerequisite: Math 31 or permission of instructor. Second Session: MTWThF 7:35–8:55 pm.

111 Mathematics for Engineers and Physicists I (3)

Differential equations, linear and multilinear algebra, Fourier series. Prerequisite: Math 33, 34; or permission of instructor. First Session: MTWThF 7:35–8:55 pm.

112 Mathematics for Engineers and Physicists II (3)

Fourier integral, Laplace transform, partial differential equations. Prerequisite: Math 111. Second Session: MTWThF 7:35–8:55 pm.

113 Graph Theory (3)

Directed and undirected graphs; bridges, cutpoints, and blocks; connectivity; partitions; Eulerian and Hamiltonian graphs; planarity; coloring problems. Prerequisite: Math 32. Second Session: MTWThF 7:35–8:55 pm.

* 30 may be waived as a prerequisite requirement by examination on scheduled dates. g this prerequisite requirement does not entitle the student to any semester hours of credit.

124 Introduction to Matrix Theory (3)
Operations on matrices, determinants, linear equations, matrix inversion, vector spaces, characteristic roots and vectors, spectral theorem, quadratic forms. Prerequisite: Math 32, 34. First Session: MTWTh 7:35–9:15 pm.

139 Advanced Calculus I (3)
Review and extension of elementary one-variable calculus, emphasis on the theoretical foundations; differential calculus of several variables. Prerequisite: Math 33. First Session: MTWThF 6–7:20 pm.

140 Advanced Calculus II (3)
Differential and integral calculus of several variables; implicit function theorem, differential forms. Prerequisite: Math 139 or equivalent. Second Session: MTWThF 6–7:20 pm.

***166 Introduction to Graph Theory for Teachers (3)**
Graph theory with applications to matchings, networks, programming, economics, psychology, biology, puzzles. Prerequisite: Math 31 or equivalent. First Session: MTWThF as arranged.

***168 Seminar: Curriculum Studies (3)**
Critical examination of secondary school mathematics curricula, techniques, and programs. Prerequisite: Math 31 and permission of instructor. First Session: MTWThF as arranged.

259 Topics in Algebra (3)
(Formerly Advanced Topics in Group Theory)
Topics in combinatorial mathematics. Prerequisite: Math 266. First Session: MTWTh 5:45–7:25 pm.

269 Integral Equations (3)
Prerequisite: Math 123 or equivalent; Math 139, 140. Second Session: MTWThF 6–7:20 pm.

295 Reading and Research (3)
May be repeated once for credit. Both sessions.

299–300 Thesis Research (3–3)
Both sessions.

398 Advanced Reading and Research (ARR.)
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. Both sessions.

399 Dissertation Research (ARR.)
Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

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* Open only to candidates for the degree of Master of Science for Teachers, teachers for in-service training, or students recommended by the Department of Education.

Music

George Steiner, *Chairman*

MUSIC HISTORY AND LITERATURE

3 Introduction to Musical Understanding (3)

Introductory history of musical styles, related to listening; elements and materials of music. First Session: Section A—MTWTh 5:45–7:25 pm. Second Session: Section B—MTWThF 11:10 am–12:30 pm.

4 Survey of Music Literature (3)

Introductory study of musical forms, structures, and textures; aural analysis of selected literature. First Session: MTWThF 1:10–2:30 pm.

MUSIC THEORY

5–6 Elementary Harmony (3–3)

Triads, inversions; chord analysis, construction, and progression; part-writing, modulations, figured bass. Prerequisite: Mus 1 or satisfactory passing of placement examination. First Session: Mus 5; Second Session: Mus 6. MTWThF 4:10–5:30 pm.

299–300 Thesis Research (3–3)

Both sessions.

APPLIED MUSIC

Applied Music courses listed below may be repeated for credit. Each course is individual lessons of 45 minutes twice a week; supplementary fee, $40.

11 Piano (1)

Both sessions.

13 Voice (1)

Both sessions.

15 Organ (1)

Both sessions.

17 Violin (1)

Both sessions.

19 Classical Guitar (1)

Both sessions.

21 Viola (1)

Both sessions.

23 Cello (1)

Both sessions.

25 Bass (1)

Both sessions.

27 **Flute** (1)
Both sessions.

29 **Recorder** (1)
Both sessions

31 **Oboe** (1)
Both sessions.

33 **Clarinet** (1)
Both sessions.

35 **Saxophone** (1)
Both sessions.

37 **Bassoon** (1)
Both sessions.

39 **French Horn** (1)
Both sessions.

41 **Trumpet** (1)
Both sessions.

43 **Trombone** (1)
Both sessions.

45 **Percussion** (1)
Both sessions.

47 **Harp** (1)
Both sessions.

111 **Piano** (1)
Both sessions.

113 **Voice** (1)
Both sessions.

115 **Organ** (1)
Both sessions.

117 **Orchestral Instrument** (1)
Both sessions.

119 **Classical Guitar** (1)
Both sessions.

hilosophy

H. Schlagel, *Chairman*

61–62 **Introduction to Philosophy** (3–3)

Problems of modern philosophy in relation to scientific and social developments since the Renaissance. Phil 61: theories of reality. Phil 62: theories of knowledge. Phil 61 or 62 may be taken independently. First Session: Phil 61; Second Session: Phil 62. MTWThF 9:40–11 am.

111 **History of Ancient Philosophy** (3)

History of Western philosophy from early Greece to the early Middle Ages. Second Session: MTWThF 1:10–2:30 pm.

*127 **Theories of History** (3)

Critiques of philosophies of history: idea of progress, historicism, Hegelian-Marxian dialectic, cyclical, and social-scientific views. Contemporary problems of historical knowledge. First Session: MTWThF 11:10 am–12:30 pm.

152 **Knowledge, Truth, and Reality** (3)

Inquiry into the basis and structure of knowledge, the problem of perception and independent reality, and the meaning and criteria of truth. Second Session: MTWThF 11:10 am–12:30 pm.

162 **Aesthetics** (3)

Nature of aesthetic experience, problems of appreciation and criticism in the arts, and theories of artistic creation. Emphasis on contemporary arts and criticism. First Session: MTWThF 8:10–9:30 am.

193 **Contemporary Philosophy: Phenomenological** (3)

The phenomenological movement, including its development into German and French existentialism, and its more recent phases. First Session: MTWThF 1:10–2:30 pm.

ysical Education

Breen, *Chairman*

University is not responsible for injuries received in intramural games, or ny of the activities of the Department of Physical Education; and the stu- assumes full responsibility therefor.

4 **Physical Education Activities** (1)

Five periods of supervised activity a week; coeducational. Medical classification A only. May be repeated for credit not to exceed 4 semester hours. Physical Education fee, $4.50 a session. First Session: Section A (fencing)—MTWThF 9–10 am; Section B (golf)—MTWThF 10–11 am.

*Interdepartmental course offered by the departments of Philosophy and History.

57 Dance Technique I (1)

A 3-week course, June 14 to July 2: MTWThF 9–10:30 am. (See Dance Workshop, pages 33–34.)

58 Dance Technique II (1)

A 3-week course, June 14 to July 2: MTWThF 9–10:30 am. (See Dance Workshop, pages 33–34.)

***101 Physical Education in the Elementary School** (3)

For Elementary Education and Physical Education majors. Implications of child growth and development for school and playground programs: philosophy, curriculum, techniques of teaching, facilities and equipment, evaluation. A 3-week course, July 6 to July 23: MTWThF 4:10–6 pm; conference and field activities as arranged.

110 Dance Composition II (1)

A 3-week course, June 14 to July 2: MTWThF 11 am–12:30 pm. (See Dance Workshop, pages 33–34.)

***119 Creative Dance for Children** (3)

The study of dance as an expressive medium for children: emphasis on concepts and principles, methods and materials. Consideration given to dance for children with special education problems. A 3-week course, July 6 to July 23: MTWThF 9–12 am; field work as arranged.

120 Repertory (1)

A 3-week course, June 14 to July 2: MTWThF 2–3:30 pm. (See Dance Workshop, pages 33–34.)

122 Methods and Materials for Health Education (3)

Curriculum planning and organization, methodology, selection and use of materials of health education, evaluation, basic health knowledge. A six-week course, June 14 to July 23: MW 3:45–5:45 pm.

202 Motor Learning (3)

Theories of motor development and learning; variables of motor performance and learning with implications for teaching movement skills. A 6-week course, June 14 to July 23: TTh 6:10–8 pm.

211 Problems and Modern Trends in Physical Education (3)

For experienced teachers. Organization, supervision, and curriculum problems growing out of current issues; program planning policies; competition. A 6-week course, June 14 to July 23: MW 6:10–8 pm.

265 Driver and Safety Education III (3)

Modern methods and materials in traffic safety and driver education; psychological testing; Drivucator; multiple car method. A 6-week course June 14 to July 23: TTh 8:10–10 pm.

297 Advanced Topical Studies (3)

Independent study or field project pertinent to the needs of the student including synthesis and critique of background literature. Prerequisite Educ 295 or permission of instructor. May be repeated once for credit A 6-week course, June 14 to July 23.

* A course requiring the full daytime attention of enrollees. Concurrent registration for another course scheduled in morning or afternoon not permitted.

For information concerning the Dance Workshop, see pages 33–34.

hysics

lian Eisenstein, *Chairman*

1 General Physics (4)

Topics in classical physics which form a foundation for modern physics. Prerequisite: two years of college preparatory mathematics or concurrent registration for Math 6. Laboratory fee, $11. First Session: Section A—lecture MWF 1:10–3 pm, recitation TTh 9:40–11 am, laboratory MWF 9:40–12 am; Section B—lecture MWF 1:10–3 pm, recitation TTh 1:10–2:30 pm, laboratory MWF 3:10–5:30 pm.

2 Introduction to Modern Physics (4)

Selected topics in modern physics, including electromagnetic phenomena. Prerequisite: Phys 1 or equivalent. Phys 1 may be waived on the basis of the College Entrance Examination Board Achievement Test or Advanced Placement Examination or by a departmental examination prior to registration. Laboratory fee, $11. Second Session: Section A—lecture MWF 1:10–3 pm, recitation TTh 9:40–11 am, laboratory MWF 9:40–12 am; Section B—lecture MWF 1:10–3 pm, recitation TTh 1:10–2:30 pm, laboratory MWF 3:10–5:30 pm.

9–10 Introduction to Astronomy (3–3)

Classical through modern astronomy with introduction to basic principles underlying astronomical systems and observations. Primarily for non-science majors. Laboratory fee, $11 a session. First Session: Phys 9; Second Session: Phys 10. Lecture MWF 8:10–9:30 am, recitation TTh 8:10–9:30 am, laboratory MWF 9:40–11:40 am.

–300 Thesis Research (3–3)

First Session: Phys 299; Second Session: Phys 300.

399 Dissertation Research (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

ical Science

LeBlanc, *Chairman*

tmental prerequisite: P Sc 5–6 is prerequisite to all second-group courses itical Science.

5–6 Introduction to Political Science (3–3)

P Sc 5: an introduction to the study of comparative political systems. Emphasis on contemporary concepts and techniques used to examine politics and government. P Sc 6: structure, powers, and processes of the American political system—Congress, the President, and the Supreme

Court; elections, political parties, and pressure groups; state and local governments. First Session: P Sc 5A—MTWThF 9:40–11 am; P Sc 6—MTWThF 11:10 am–12:30 pm. Second Session: P Sc 5B—MTWThF 11:10 am–12:30 pm.

101 **Far East in the Modern World** (3)

First Session: MTWThF 8:10–9:30 am. (See Russian-East Asian Studies program, pages 35–37.)

103–4 **State and Local Governments** (3–3)

P Sc 103: state and local political systems, theory of sub-national governments, intergovernmental relations, metropolitan government and politics. P Sc 104: urban political systems, issues in urban politics, city and regional planning, and the political process. First Session: P Sc 103; Second Session: P Sc 104. MTWThF 8:10–9:30 am.

108 **Science, Technology, and Politics** (3)

Examination of the multiple impacts of scientific and technological developments on the social system. Evaluation of the response of the political system to these impacts. Discussion of policies for the support, use, and control of science and technology. First Session: MTWThF 11:10 am–12:30 pm.

111 **Comparative Government and Politics** (3)

Introduction to the government and politics of the principal constitutional democracies of Western Europe: Great Britain, France, and the Federal Republic of Germany; secondary reference to other Western European systems and the communist government of East Germany. First Session: MTWTh 7:35–9:15 pm.

*112 **Comparative Government and Politics** (3)

Introduction to the government and politics of the communist nations; emphasis on the Soviet Union and the countries of Eastern Europe. First Session: MTWThF 11:10 am–12:30 pm.

*115 **Government and Politics in Eastern Europe** (3)

Second Session: MTWThF 4:10–5:30 pm. (See Russian-East Asian Studies program, pages 35–37.)

118 **Political Theory: Nature and Growth of Western Political Thought** (3)

The Renaissance and Reformation to recent times. Theoretical foundations of the modern state: morals and politics, sovereignty, absolutism, obedience, and resistance; liberalism, democracy, conservatism. Second Session: MTWTh 4:10–5:50 pm.

121 **U.S. Constitutional Law and Politics** (3)

Separation of powers, federal-state relationships, economic regulation. Prerequisite: junior status. First Session: MTWThF 9:40–11 am.

125 **The American Congress** (3)

Congress: the legislative process of the House of Representatives and Senate. The men, the committees, and the system. First Session MWF 1:10–3:10 pm.

* P Sc 112, 115, and 161 are related in their subject matter, and credit for only one of the three may be applied toward a degree.

160 **Modern Communist Ideologies** (3)

First Session: MTWThF 4:10–5:30 pm. (See Russian-East Asian Studies program, pages 35–37.)

*161 **Soviet Government and Politics** (3)

First Session: MTWTh 7:35–9:15 pm. (See Russian-East Asian Studies program, pages 35–37.)

163 **Soviet Foreign Policy** (3)

First Session: MTWTh 5:45–7:25 pm. (See Russian-East Asian Studies program, pages 35–37.)

167 **U.S. Foreign Policy** (3)

Constitutional and political factors that determine the formulation, execution, and substance of U.S. foreign policy. First Session: MTWThF 1:10–2:30 pm.

171 **International Politics** (3)

International actors, international and domestic environments of foreign policy, global and regional patterns, general characteristics of foreign policy. First Session: MTWThF 4:10–5:30 pm.

177 **Governments and Politics in Latin America** (3)

Political processes and institutions in Latin America; emphasis on Argentina, Brazil, Chile, and Mexico. Second Session: MTWThF 11:10 am–12:30 pm.

178 **Latin America: Political Patterns and International Relations** (3)

Patterns of political development, foreign policies of selected states, inter-American diplomacy and organization, United States-Latin American relations. Second Session: MTWThF 1:10–2:30 pm.

1–82 **Public International Law and Organization** (3–3)

Survey of the public law of nations. P Sc 181: emphasis on the law of peace. P Sc 182: continuation of the law of peace; attention to neutrality and the so-called law of war. Second Session: P Sc 181—MTWThF 11:10 am–12:30 pm; P Sc 182—MTWThF 1:10–2:30 pm.

189 **African International Politics** (3)

Analysis of interstate relations in Africa and of selected aspects of African relations with the outside world. Recommended but not required: P Sc 190 or equivalent. First Session: MTWThF 1:10–2:30 pm.

191 **Governments and Politics of the Middle East** (3)

Domestic and international politics of the eastern Arab states, Turkey, Iran, Israel. First Session: MTWThF 11:10 am–12:30 pm.

192 **Governments and Politics of North Africa** (3)

Domestic and international politics of Algeria, Tunisia, Morocco, Libya, Egypt, Sudan; their relations with states of the Middle East. First Session: MTWThF 1:10–2:30 pm.

12, 115, and 161 are related in their subject matter, and credit for only one of the three pplied toward a degree.

194 **Governments of China and Japan** (3)

First Session: MTWThF 9:40–11 am. (See Russian-East Asian Studies program, pages 35–37.)

297 **Independent Studies** (arr.)

Limited to Master's candidates. Permission of instructor, in writing, required. First Session.

299–300 **Thesis Research** (3–3)

Both sessions.

For information concerning the special program in Russian-East Asian Studies, see pages 35–37.

Psychology

B.I. Levy, *Chairman*

Departmental prerequisite: Psyc 1 or 5 or 6 is prerequisite to all other courses in Psychology. Six semester hours in first-group Psychology courses are prerequisite to all second-group courses in Psychology.
Third-group courses are limited to graduate students in Psychology, except by special permission of instructor and Chairman of the Department.

1 **General Psychology** (3)

Fundamental principles underlying human behavior. First Session: Section A—MTWThF 8:10–9:30 am; Section B—MTWThF 4:10–5:30 pm. Second Session: Section C—MTWThF 4:10–5:30 pm; Section D—MTWThF 9:40–11 am.

6 **Principles and Methods of Psychology** (3)

An experimental approach to understanding behavior; individual and class experiments performed. Topics of motivation, learning, memory, and problem solving. Laboratory fee, $6. Second Session: lecture MWF 1:10–3 pm, laboratory TTh 1:10–3 pm.

8 **Psychology of Motivation and Personality** (3)

Introduction to the psychology of personality. Principles of motivation, personality development, social and cultural factors, and assessment and description of personality emphasized. First Session: Section A—MTWThF 1:10–2:30 pm. Second Session: Section B—MTWTh 5:45–7:25 pm.

22 **Introduction to Educational Psychology** (3)

Consideration of individual and group differences, adjustments, and the psychology of learning in relation to education and training. First 3-Week Education Workshop Session, June 14 to July 2: Section A—June 15–18, lecture 3:45–5:45 pm, small group discussions—evening; June 21–July 2, lecture 10:10–12 am, conference 9:10–10 am. Second Session Section B—MTWThF 11:10 am–12:30 pm.

29 Psychology of Childhood (3)

Developmental approach to study of the child. Emphasis on the socialization process, learning, and the child's view of the world. First Session: MTWThF 1:10–2:30 pm.

101 Abnormal Psychology (3)

Causes, diagnosis, treatment, and prevention of various types of maladjustments and mental disorders. Prerequisite: 6 semester hours in psychology, or 3 in psychology and 6 in a biological science. First Session: Section A—MTWThF 1:10–2:30 pm. Second Session: Section B—MTWThF 4:10–5:30 pm.

115 Psychology of Language and Communication (3)

Introduction to psycholinguistics and verbal behavior. Information theory, measurement of meaning, cultural and linguistic structures in the perception and learning of language. First Session: MTWThF 4:10–5:30 pm.

118 Physiological Psychology (3)

Basic structure and functions of sensory systems, motor systems, central nervous system, autonomic nervous system, and endocrine system, with emphasis on the relations between physiological functioning and behavior. First Session: MTWThF 11:10 am–12:30 pm.

121 Psychology of Learning (3)

Current learning theories and issues. Second Session: MTWThF 1:10–2:30 pm.

129 Theories of Personality (3)

Survey of personality theories; emphasis on their application to problems of individuals. First Session: Section A—MTWThF 9:40–11 am. Second Session: Section B—MTWTh 7:35–9:15 pm.

131 Psychological Tests (3)

Survey of psychological tests and their more common uses in business, industry, government, law, medicine, and education. Material fee, $7. First Session: Section A—MTWThF 9:40–11 am. Second Session: Section B—MTWThF 11:10 am–12:30 pm.

145 Psychology of Management (3)

Primarily for students in the schools of Engineering and Applied Science and Government and Business Administration. Introduction to principles of industrial organizations and personnel selection. Departmental prerequisite waived. First Session: MWTh 6:10–8 pm.

151 Social Psychology (3)

Social foundations of attitudes and behavior: cognition, motivation, role-behavior, communication, small-group processes, racial attitudes, nationalism, and war. Second Session: MTWThF 9:40–11 am.

156 Psychology of Attitudes and Public Opinion (3)

Psychology of opinion formation, measurement of opinion, social determinants of attitudes, psychological processes in propaganda, bases of receptivity to propaganda, psychological warfare. Second Session: MTWTh 7:35–9:15 pm.

161 **Comparative Psychology** (3)

Lectures and demonstrations on animal psychology. Psychological processes in infrahuman organisms, evolution of behavior, the place of animal experimentation and research in psychology. First Session: MTWThF 9:40–11 am.

191 **Independent Research in Psychology** (3)

Opportunity for work on individual library or experimental projects. Open to qualified students by permission; arrangements must be made with the sponsoring faculty member prior to registration. May be repeated once for credit. Both sessions.

196 **History and Systems of Psychology** (3)

Senior capstone course which includes a survey and integration of the major viewpoints and concepts of psychology. Required of Psychology majors. First Session: MTWThF 9:40–11 am.

211 **Assessment of Cognitive Functioning** (3)

Concepts of intelligence and achievement and their assessment through a variety of group and individual procedures. Emphasis on evaluation of children. Material fee, $7. Admission by permission of instructor. Second Session: MWTh 4:10–6 pm.

212 **Personality Assessment by Projective Techniques** (3)

Methods of personality assessment, including psychometric and projective tests. Material fee, $7. Admission by permission of instructor. Second Session: MWTh 6:10–8 pm.

215 **Personality Assessment by Multiple Procedures** (3)

Consideration and use of a wide range of procedures in assessment of personality and psychopathology of children. Prerequisite: Psyc 207–8 or 211 and 212. Graduate students in fields other than psychology admitted by permission of instructor. Material fee, $7. First Session: MWTh 6:10–8 pm.

218 **Seminar: Systems of Psychotherapy** (3)

Introduction to theory and technique of psychotherapeutic approaches: psychoanalytic, ego-centered, nondirective, transactional, and others. Original sources surveyed. First Session: MWTh 4:10–6 pm.

231 **Development of Psychometric Instruments** (3)

Quantitative techniques and principles used in construction, standardization, and evaluation of personality and ability measures for research and practice; quantification of human judgment for measurement purposes. Prerequisite: course in tests and measurements and an elementary course in statistics. First Session: MWTh 6:10–8 pm.

283–84 **Practicum in Clinical Psychology** (3–3)

Supervised practical instruction in agencies doing clinical psychological work. Prerequisite: Psyc 212. Admission by permission of instructor. Both sessions.

295 **Independent Research in Psychology** (3)

Individual library or experimental research under supervision of staff member. Arrangements must be made with sponsoring faculty member prior to registration. May be repeated once for credit. Both sessions.

299–300 **Thesis Research** (3–3)

Both sessions.

398 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. Both sessions.

399 **Dissertation Research** (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

ublic Administration

R. Cloutier, *Chairman*

221 **Management in the Executive Branch** (3)

Analysis of application of management theory and practice in the executive branch of the federal government: emphasis on staff responsibilities and relationships and internal organization and control. Second Session: TTh 6:10–9 pm.

223 **Behavioral Factors in Large Organizations** (3)

Analysis of the nature and characteristics of bureaucracy; dysfunctionalism; approaches to policy guidance and leadership, particularly in large public organizations; influence and control systems. First Session: MWF 6:10–8 pm.

248 **Financing Metropolitan Services** (3)

Analysis of the structure and administration of public finance of local governments. First Session: TTh 6:10–9 pm.

251 **Governmental Budgeting** (3)

Survey of the basic concepts, principles, and practices in governmental budgeting; interrelationship of planning, programming, and budgeting; their role in the management process. Second Session: MWF 6:10–8 pm.

260 **Seminar: Policy Formulation and Administration** (3)

Analysis in depth of factors and processes involved in policy development with particular attention to selected areas of national policy; development of agency goals and objectives. First Session: MWF 6:10–8 pm.

271 **Readings and Research in Public Administration** (3)

Advanced directed readings and research in specific areas of public administration. First Session.

299 **Thesis Seminar** (3)

Examination of thesis standards, research philosophy and methodology. First Session: MWF 8:10–10 pm.

300 **Thesis Research** (3)

Second Session.

Religion

R.G. Jones, *Chairman*

9 The Old Testament (3)

Historical and literary study of the Old Testament with consideration of development of religious ideas, institutions, and outstanding personalities. First Session: MTWThF 9:40–11 am.

59–60 History of Religions (3–3)

Origins, evolution, and contemporary status in historical context. Rel 59: primitive religion and the religions of the East (Hinduism, Buddhism, Taoism, Confucianism, Shinto). Rel 60: religions of the West and Near East (ancient religions, Judaism, Christianity, Islam). First Session: Rel 59; Second Session: Rel 60. MTWThF 11:10 am–12:30 pm.

121 Philosophical Problems of Western Religious Thought (3)

Classical and contemporary religious thinkers with reference to the nature of religious truth and experience; the existence, character, and activity of God; and the predicament of man. First Session: MTWTh 5:45–7:25 pm.

137 The Land of Israel and the Growth of the Western Religions (6)

(See Summer Institute in Israel program, page 38.)

172 Religion in American Culture (3)

Growth of religious bodies and institutions in relation to American culture, development of religious thought, and analysis of the contemporary religious scene. Second Session: MTWTh 5:45–7:25 pm.

291–92 Readings and Research (3–3)

Investigation of special problems. Both sessions.

299–300 Thesis Research (3–3)

Both sessions.

For information concerning the Summer Institute in Israel, see page 38.

Slavic Languages and Literatures

C.A. Moser, *Chairman*

Placement Examination: a standardized placement examination given before registration is required of all entering students who wish to continue in college the language begun in high school. Upon completion of the examination, assignment is made to the appropriate course, with credit assigned on the usual basis.

5–6 **Intensive Beginning Russian** (6–6)

Beginners' intensive course in the fundamentals of Russian phonology, structure, and vocabulary. Emphasis on active command of the spoken and written language. Maximum participation on the part of the student. Drill sessions to facilitate aural comprehension and oral expression. Graded reading and written practice. Listening comprehension and oral practice in language laboratory. Prerequisite to Slav 6: Slav 2 or 5. Laboratory fee, $17.50. First Session: Slav 5; Second Session: Slav 6. Classroom—MTWThF 9:30–11:30 am and 1–3 pm, laboratory—TTh 3:10–4 pm.

47 **Beginning Russian for Reading Examination Candidates** (0)

For graduate students with little or no knowledge of Russian who intend to use the language as a research tool. No academic credit. Tuition fee, $222. First Session: MTWTh 5:45–7:25 pm.

49 **Russian Readings for Nonmajor Students** (3)

Primarily for graduate students preparing for reading examinations. Undergraduates admitted with permission of instructor. No academic credit for graduate students. Prerequisite: Slav 4, 6, or 47; or equivalent. Second Session: MTWTh 5:45–7:25 pm.

91–92 **Introduction to Russian Literature** (3–3)

Survey of Russian literature, in translation, from earliest periods through literary masterpieces of the 19th and early 20th centuries. Lecture, recitation, and discussion—in English. Term paper required. First Session: Slav 91; Second Session: Slav 92. MTWTh 5:45–7:25 pm.

ciology

. Brown, *Chairman*

partmental prerequisite: Soc 1 and either 2 or 61 are prerequisite to all sec- and third-group courses in Sociology.

1–2 **Introductory Sociology** (3–3)

Soc 1: general principles of sociology; development of culture and personality, impact of groups and institutions on man's social behavior; survey of fields within sociology. Soc 2: analysis of major social problems confronting the United States; factors producing social problems, their nature and treatment. First Session: Soc 1; Second Session: Soc 2. MTWThF 9:40–11 am.

61 **Development of Social Thought** (3)

Examination of concepts and theories relevant to the nature of society and human relationships from ancient writings to the 20th century. Prerequisite: Soc 1. Second Session: MTWThF 11:10 am–12:30 pm.

110 **The Sociology of Work** (3)

Introductory survey of industrial sociology; sociology of occupations and professions; industry-community relations; and analysis of large, complex organizations. First Session: MTWThF 8:10–9:30 am.

124 **Medical Sociology** (3)

Analysis of social factors and processes related to the etiology and treatment of physical and mental illness; study of medical occupations and professions and their patterned social relationships within medical organizations, principally hospitals; emphasis on problems of delivery of health care services. First Session: MTWThF 1:10–2:30 pm.

125 **Sociology of Religion** (3)

Introduction to history of the discipline; analysis of reciprocal impact of secular upon religious and religious upon secular institutions. First Session: MTWThF 1:10–2:30 pm.

126 **Urban Sociology** (3)

Place of the city in larger society; growth of the city, problems of urban living, group life, personality, urban housing, city planning, and suburban development. Second Session: MTWThF 9:40–11 am.

127 **Population Problems** (3)

Composition of populations, trends in population growth and population pressure, factors producing population movements, effects of migration, population policies—eugenics and birth control. First Session: MTWThF 11:10 am–12:30 pm.

135 **Juvenile Delinquency** (3)

Factors producing delinquency, juvenile detention, the juvenile court, training schools, treatment of offenders. Second Session: MTWThF 11:10 am–12:30 pm.

136 **Criminology** (3)

Nature and distribution of crime as related to the development and operation of criminal law and various social and legal institutions in urban society. First Session: MTWThF 11:10 am–12:30 pm.

147 **Organizational Theory and Behavior** (3)

Introductory survey of traditional, contemporary theories and research describing behavior in large, complex organizations and their impact on American social life. First Session: MTWThF 9:40–11 am.

149 **Modern Sociological Theory** (3)

Systematic study of contemporary schools of sociological theory, both European and American development; evaluation of scientific contributions of each school. Prerequisite: Soc 61. First Session: MTWThF 4:10–5:30 pm.

191 **Current Emphases in Sociology** (3)

Analysis and evaluation of recent developments in the general field of sociology and a review and discussion of basic concepts. Recommended for all senior sociology majors who plan to undertake graduate study in sociology. First Session: MTWThF 8:10–9:30 am.

295 **Research** (3)

May be repeated once for credit. Both sessions.

299–300 **Thesis Research** (3–3)

Both sessions.

398 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. Both sessions.

399 **Dissertation Research** (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

panish

dministered by the Department of Romance Languages and Literatures, F. Burks, *Chairman*

acement Examination: a standardized placement examination given before gistration is required of all entering students who wish to continue in college e language begun in high school. Upon completion of the examination, signment is made to the appropriate course, with credit assigned on the usual sis.

partmental prerequisite: Span 3–4 or 6, or equivalent, is required (Span 51–52 or 91–92 is recommended) as prerequisite to all second-group courses in nish.

1–2 **First-year Spanish** (3–3)

A year course: credit toward a degree at this University given on completion of Span 2. For beginners. Pronunciation, conversation, grammar, composition, reading of modern Spanish prose. Aural training, oral practice in language laboratory. Laboratory fee, $17.50 a session. First Session: Span 1; Second Session: Span 2. Classroom—MTWThF 8:10–9:30 am, laboratory—MTh 10:10–11 am.

3–4 **Second-year Spanish** (3–3)

A year course: credit toward a degree at this University given on completion of Span 4. Conversation, grammar, composition, reading of modern Spanish prose, introduction to Hispanic civilization. Aural training, oral practice in language laboratory. Laboratory fee, $17.50 a session. Prerequisite: Span 1–2, 2*x*, or two years of high school Spanish. First Session: Span 3; Second Session: Span 4. Classroom—MTWThF 11:10 am–12:30 pm, laboratory—MTh 9:10–10 am.

9 **Spanish Conversation and Composition** (3)

Prerequisite: Span 4 or equivalent and permission of instructor. First Session: MTWThF 11:10 am–12:30 pm.

130 **The Modern Spanish Essay** (3)

Development of the Spanish essay from the 16th century; emphasis on the 18th and 19th centuries. Class analysis of texts, collateral reading, and lectures. First Session: MTWThF 1:10–2:30 pm.

141 **Introduction to Spanish American Literature** (6)

Highlights of Spanish American literature through the colonial and modern periods. Given in English, with readings in Spanish. Of special in-

terest to majors in Latin American Studies. First Session: MTWThF 9:40–11 am and 1:10–2:30 pm.

295 **Independent Reading and Research in Spanish and Spanish American Literature** (arr.)

For students preparing for the Master of Arts degree. May be repeated for credit. First Session.

299 **Thesis Research** (3)

First Session.

Special Education

Perry Botwin, *Chairman*

SIX-WEEK COURSES—JUNE 14 TO JULY 23

291 **Practicum in Teaching Children with Behavioral Problems** (6)

Supervised student teaching in programs for children with behavioral problems under the direction of a qualified teacher and the supervision of the University staff. Minimum of 210 clock hours required. Admission by permission of instructor. As arranged.

292 **Practicum in Teaching Young Children in Special Education** (3)

Supervised student teaching in special education in classrooms for young children. Minimum of 210 clock hours required. As arranged.

FIRST 3-WEEK EDUCATION WORKSHOP SESSION—JUNE 14 TO JULY 2

Classes meet Monday through Friday. Each workshop course requires the full day; concurrent registration for another daytime course is not permitted. June 15 to 18—small group discussions, evening; June 21 to July 2—small group discussions and field work, afternoon.

240 **Educational Programming for Children with Behavioral Problems** (3)

Analysis of educational provisions for children with behavioral problems through study of ecological considerations in the light of contemporary special education theory. Admission by permission of instructor. June 15 to 18: lecture 3:45–5:45 pm. June 21 to July 2: lecture 8:10–10 am; conference 10:10–11 am.

250 **Specialized Techniques and Materials for Diagnostic-Prescriptive Teachers** (3)

(Formerly Advanced Specialized Teaching Techniques and Materials)

Selected materials and techniques used in diagnostic-prescriptive teaching. Admission by permission of instructor. Students who register for S Ed 250 must also register for S Ed 252 in the Second 3-Week Education Workshop Session. June 15 to 18: lecture 3:45–5:45 pm. June 21 to July 2: As arranged.

251 **Psychosocial Factors in Diagnostic-Prescriptive Teaching** (3)

(Formerly Psychosocial Considerations in Special Education)

Psychosocial factors significant in the process of diagnostic-prescriptive teaching. Admission by permission of instructor. June 15 to 18: lec-

ture 3:45–5:45 pm. June 21 to July 2: lecture 8:10–10 am; conference 10:10–11 am.

253 **The Humanizing Curriculum and Diagnostic-Prescriptive Teaching** (3)

Curriculum concepts and modifications aimed at enhancing the classroom environment for learning and growth. Admission by permission of instructor. June 15 to 18: lecture 3:45–5:45 pm. June 21 to July 2: lecture 10:10–12 am; conference 9:10–10 am.

260 **Diagnosis of the Educational Needs of Younger Children** (3)

Lecture-demonstration course designed to explore the existing and experimental diagnostic tools to aid in education planning for young children. Admission by permission of instructor. June 15 to 18: lecture 3:45–5:45 pm. June 21 to July 2: lecture 10:10–12 am; conference 9:10–10 am.

491 **Dissertation Research** (arr.)

COND 3-WEEK EDUCATION WORKSHOP SESSION—JULY 6 TO JULY 23

asses meet Monday through Friday. Concurrent registration for another day-e course is not permitted, because each workshop course requires the full —lecture and conference in the morning; small group discussion and field rk or laboratory in the afternoon.

201 **Introduction to Special Education** (3)

Survey course to acquaint prospective teachers with special education and to help them become aware of the various educational modifications necessary to accommondate children in a school program. Lecture 10:10–12 am; conference 9:10–10 am.

252 **Professional Internship for Diagnostic-Prescriptive Teachers** (3)
(Formerly Professional Internship: Special Education)

Supervised school experience in diagnostic-prescriptive teaching. Admission by permission of instructor. Students who register for S Ed 252 must also register for S Ed 250 in the First 3-Week Education Workshop Session. As arranged.

261 **Special Methods for Teaching Young Children** (3)

Study and laboratory practice in specialized techniques and materials for young children. Students develop and experiment with new methods and materials. Admission by permission of instructor. Lecture 10:10–12 am; conference 9:10–10 am.

308 **Instructional Media, Technology, and Education** (3)

Review and consideration of technological developments as they affect education and special education, including historical perspective; operating principles of various kinds of hardware, including printing, audio-visual equipment, television, and computers. Status of software for use with hardware. Admission by permission of instructor. As arranged.

342 **Seminar: Crisis/Resource Teaching** (3)

Topics and concepts relevant to an exploration of alternative models in the education of children perceived as having learning/behavior problems. Admission by permission of instructor. Lecture 8:10–10 am; conference 10:10–11 am.

350 **The Diagnostic-Prescriptive Teacher** (3)

Rationale, operational models, techniques, and problems relevant to implementation of diagnostic-prescriptive teacher programs. Admission by permission of instructor. Lecture 10:10–12 am; conference 9:10–10 am.

370 **Intrapersonal Dynamics in Special Education** (3)

Small group exploration of intrapersonal factors essential to understanding roles and interpersonal techniques in teaching exceptional children. Admission by permission of instructor. Lecture 8:10–10 am; conference 10:10–11 am.

491 **Dissertation Research** (arr.)

THIRD 3-WEEK EDUCATION WORKSHOP SESSION—JULY 26 TO AUGUST 13

Classes meet Monday through Friday. Concurrent registration for another daytime course is not permitted, because each workshop course requires the full day—lectures and conference in the morning; small group discussion and field work or laboratory in the afternoon.

242 **Clinical Teaching of Children with Behavioral Problems** (3)

Lectures and discussions exploring various psychoeducational techniques of teaching children and adolescents with behavioral problems, interpersonal interaction between teachers and disturbed children, use of group factors in the teaching-learning process, and selection of appropriate teaching methods and materials. Admission by permission of instructor. Lecture 8:10–10 am; conference 10:10–11 am.

491 **Dissertation Research** (arr.)

Speech and Drama

G.F. Henigan, *Chairman*

1 **Communicative Speaking and Listening** (3)

Basic theories and principles of speech communication; composition, delivery, and criticism of speaking in interpersonal, group, and public situations. Recording fee, $2. First Session: Section A—MTWTh 5:45–7:25 pm. Second Session: Section B—MTWThF 1:10–2:30 pm.

11 **Voice and Diction** (3)

Development of naturalness, correctness, and clarity in conversational speech. Analysis and correction of individual speech delivery faults through tapes and weekly performances. Class instruction on concepts of acceptable voice and diction standards. Recording fee, $4. First Session: MTWThF 11:10 am–12:30 pm.

32 **Oral Interpretation of Literature** (3)

Theory and practice in discovering and communicating orally the meaning in literature through analysis of form and content. Techniques of reading prose, poetry, and drama for listeners. Prerequisite: Sp&D 11. Recording fee, $2. Second Session: MTWTh 5:45–7:25 pm.

45 **Understanding the Theater** (3)
(Formerly Introduction to the Theater)
The art of the theater: its literature, aesthetics, and mechanics. Contemporary drama and film art. Contributions of the playwright, actor, director, and designer examined through lectures, visiting artists, class discussions, and attendance at theatrical performances. Primarily for nonmajors. First Session: MTWThF 1:10–2:30 pm.

115 **Acting** (3)
Study and practice of fundamentals of acting technique: sense memory, improvisation, character analysis, role development. Prerequisite: Sp&D 32. Second Session: MTWTh 5:45–7:25 pm.

121 **Group Discussion and Conference Leadership** (3)
Process of thinking and problem solving in committees and small groups; methods of leading discussions and conferences. Prerequisite: Sp&D 1 or permission of instructor. First Session: MTWThF 8:10–9:30 am.

123 **Training the Student Advocate: Special Events** (2)
A 2-week course, July 12 to July 23: MTWThF 9:40 am–12:30 pm. (See Forensics Workshops, pages 34–35.)

124 **Training the Student Advocate: Debate** (3)
A 3-week course, June 21 to July 9: MTWThF 9:40 am–12:30 pm. (See Forensics Workshops, pages 34–35.)

151 **Stagecraft** (3)
Theories and practicum in the technical aspects of production. First Session: MTWTh 5:45–7:25 pm.

5–56 **Play Production Practice** (1–1)
Practical work in theater, including assigned production duties and special projects under supervision of instructor. Admission by permission of instructor. First Session: Sp&D 155; Second Session: Sp&D 156. As arranged.

169 **Introduction to Creative Dramatics** (3)
Study of philosophies and practices underlying dramatics with children, materials and methods for conducting improvised dramatic activities in elementary and secondary education. Students lead classes of children. First Session: Section A; Second Session: Section B. MTWThF 4:10–5:30 pm.

184 **Clinical Practice in Speech and Hearing** (1)
Supervised casework in speech and hearing in the University Speech and Hearing Clinic and selected off-campus facilities. May be repeated for a total of 3 semester hours. Prerequisite or concurrent registration: Sp&D 183. Both sessions.

77 **Advanced Clinical Procedures in Speech and Hearing** (3)
June 21 to July 23: MTWTh 1–2:40 pm. (See Summer Institute in Speech Pathology and Audiology, pages 38–39.)

78 **Advanced Clinical Practice in Speech and Hearing** (arr.)
Both sessions.

281 **Advanced Clinical Audiology** (3)

June 21 to July 23: MTWTh 11:10 am–12:50 pm. (See Summer Institute in Speech Pathology and Audiology, pages 38–39.)

291 **Seminar: Speech Pathology** (3)

June 21 to July 23: MTWTh 9:20–11 am. (See Summer Institute in Speech Pathology and Audiology, pages 38–39.)

292 **Seminar: Audiology** (3)

June 21 to July 23: MTWTh 2:50–4:30 pm. (See Summer Institute in Speech Pathology and Audiology, pages 38–39.)

294 **Independent Research in Dramatic Art** (arr.)

May be repeated for credit. Both sessions.

295 **Independent Research in Speech and Hearing** (arr.)

May be repeated for credit. Both sessions.

299–300 **Thesis Research** (3–3)

Both sessions.

For information concerning the special program in Speech Pathology and Audiology and the Forensics Workshops, see pages 34–35, 38–39.

Statistics

Solomon Kullback, *Chairman*

Departmental prerequisite: one entrance unit in algebra is prerequisite to all first-group courses in Statistics.

Stat 51, 53, and 91 are related in their subject matter, and credit hours for only one of the three may be applied toward a degree. Stat 52 lies outside of this group, and may be taken for degree credit in combination with any one of the other three.

49 **The Language of Statistics** (0)

For doctoral students as a minimum option in lieu of a foreign language. No academic credit. Tuition fee, $296. Second Session: MWF 9:10–12 am.

51 **Introduction to Business and Economic Statistics** (3)

Frequency distributions, descriptive measures, probability, sampling, estimation, tests of hypotheses, correlation, time series, index numbers. Laboratory fee, $11. First Session: lecture MTWThF 9:40–11 am, laboratory as arranged.

53 **Introduction to Statistics in Psychology and Education** (3)

Frequency distributions, descriptive measures, probability, sampling, estimation, tests of hypotheses, correlation, analysis of variance. Laboratory fee, $11. First Session: lecture MTWThF 1:10–2:30 pm, laboratory as arranged.

91 **Principles of Statistical Methods** (3)

Variables and attributes, averages and dispersion, frequency distributions and their characteristics, regression and correlation, statistical decision processes. Laboratory fee, $11. First Session: lecture MTWThF 1:10–2:30 pm, laboratory as arranged.

97 **Introduction to Computer Programming** (3)

Computer and programming concepts. High-level language programs written by students will be run on the University computer. Laboratory fee, $22. First Session: lecture MWF 6–7:20 pm, laboratory TTh 6–7:20 pm.

*104 **Statistics in the Behavioral Sciences and Education I** (3)

Introductory study of statistical techniques for research problems in behavioral sciences and education. Laboratory fee, $11. First Session: lecture MTWThF 4:10–5:30 pm, laboratory as arranged.

118 **Regression Analysis** (3)

Regression and correlation theory: simple, partial, and multiple. Prerequisite: 3 semester hours selected from Stat 51, 53, 91, 104, 107. Laboratory fee, $11. First Session: lecture MWF 3:10–5 pm, laboratory MW 5:10–6 pm.

119 **Bases of Statistical Decision-making** (arr.)

For students in the Navy Graduate Financial Management Program only. Introduction to techniques of decision-making, with emphasis on applications rather than theory. Includes binomial distribution, normal distribution, Type I and II errors, estimation, research methodology, and problems of inference. June 7 to July 30: as arranged.

131 **Contingency Table Techniques** (3)

Analysis of categorical data. Tests of independence, homogeneity, and interaction in simple and complex contingency tables. Tests of goodness of fit and of Markovity. Prerequisite: Stat 105 or 118, or permission of instructor. An 8-week course, June 15 to August 6: TTh 3:30–6 pm.

159 **Principles of Bayesian Statistics** (3)

Probability as a measure of uncertainty of knowledge; concepts and techniques of Bayesian inference. Prerequisite: 3 semester hours in introductory statistics or equivalent. Laboratory fee, $11. First Session: MTWThF 6–7:20 pm.

296 **Seminar: Professional Consulting in Statistics** (3)

Case studies, data analysis procedures, and problems that a consultant might encounter. Second Session: MWF 1:30–4 pm.

297 **Seminar: Problems in Mathematical Statistics** (3)

First Session: MWF 5:10–7 pm.

300 **Thesis Research** (3–3)

Both sessions.

ot be taken for credit by students who have received credit for Stat 51, 53, or 91.

*378 **Seminar: Topics in Econometrics** (3)

Limited to graduate students, primarily for doctoral candidates. A research seminar covering current econometric literature and special topics. Admission by permission of instructor. Second Session: MWTh 6:10–8 pm.

399 **Dissertation Research** (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

Urban and Regional Planning

D.C. McGrath, Jr., *Chairman*

153 **Principles of Urban Planning and Design** (3)
(Formerly U&RP 53)

An introductory studio course for undergraduates. Basic elements of urban planning and design theory, techniques, and practice are studied through classroom and field problems supplemented by seminars and lectures. Students are taught the use of elementary graphic techniques in urban problem analysis and presentation of proposals. The course is intended to provide an initial survey of planner's role and responsibilities in developing and implementing creative solutions to contemporary urban problems. Admission by permission of instructor. First Session: MTTh 1:10–4 pm.

201 **Introduction to Urban Planning** (3)

Introduction to history, concepts, and activities of urban planning. Discussion of trends in urbanism and the influences of technical and social change. First Session: TTh 6:10–9 pm.

205 **Seminar: Urban Housing** (3)

Consideration of housing problems growing out of increasing urban population. Social, economic, and design aspects of today's housing; foreign and domestic housing programs and policies. Prerequisite: U&RP 201. Second Session: MW 6:10–9 pm.

209 **Urban Transportation Models** (3)

Review, analysis, and applications of mathematical models of urban development and travel used in transportation planning. Consideration of land use activity, trip generation, trip distribution, and modal choice models as well as traffic assignment and decision-making techniques. Review of detail studies, calibration, interactions, applications, and accuracy limitations of various models. Prerequisite: Mgt 218; Stat 51, 53, or 91; U&RP 208; or permission of instructor. First Session: MTTh 8:10–10 pm.

295 **Urban Research** (3)

Directed research and investigation of special problems in community development. May be repeated once for credit. Both sessions.

299–300 **Thesis Research** (3–3)

Both sessions.

* An interdepartmental course offered by departments of Statistics and Economics.

APPENDIX: RECENTLY ESTABLISHED REGULATIONS

HE FOLLOWING UNIVERSITY REGULATIONS are under review and may be subject change in connection with the establishment of judicial processes. Bulletins d handbooks incorporating any changes will be issued as appropriate.

he following resolution, submitted by the University Senate, was approved by e University's Board of Trustees on October 19, 1968:

Whereas, safety and order are essential preconditions of the learning process, d indeed of the very concept of a university; and

Whereas, The George Washington University is committed to protection of e speech and freedom of assembly, and to safeguarding the right of lawful otest on campus; and is committed equally to maintaining the peace and ety of the campus, in the knowledge that all rights are in jeopardy when lence and civil disorder prevail over law and reason;

Now, therefore, be it resolved by the Senate of The George Washington Uni-ity: that in the event a demonstration at this University exceeds the bounds free assembly and lawful advocacy, and demonstrators are engaging in un-ful acts which cause or imminently threaten injury to persons or property, which obstruct or interfere with normal and necessary University activities, body affirms the authority of the President, or other University officials gnated to act in his absence, to take such reasonable steps, if possible after ultation with the Chairman of the Executive Committee of the University te and the President of the Student Body, as are required to restore and erve order; including, if deemed necessary and appropriate, suspension of nts or faculty engaging in such acts, and use of such law enforcement per-el as are needed to effect the removal, arrest, and prosecution of law vio-s. Any such suspension shall be reviewed by an appropriate tribunal as after order is restored as is practicably possible.

following was approved by the University's Board of Trustees on October 968:

y student suspended from The George Washington University on the ds of exceeding the bounds of free assembly and lawful advocacy shall his suspension reviewed by the Hearing Committee on Student Affairs of eorge Washington University as soon after order is restored as is prac-possible.

ollowing resolution, submitted by the Student Life Committee, was ap-by the University's Board of Trustees on October 19, 1968:

t resolved that The George Washington University: affirms its traditional tment to freedom of expression (a) by continuing to permit business and ment organizations which are recruiting employees to conduct their ac-at designated places on campus, and (b) by placing no obstacle to s who may wish to protest the presence of such recruiters, provided, r, that such protest shall be orderly and shall not impede or disrupt the r in his activities.

The University affirms its place as a forum for the free exchange of idea (a) by assuring that guests invited to speak on this campus at duly schedule meetings shall have the right to appear and to be heard, and (b) by sanction ing the freedom of students to express dissent from the views of the speaker provided, however, that that expression of dissent be orderly and nonobstruc tive.

The University distinguishes between orderly protest and resistance-by-ob struction; it accepts the former as a legitimate expression of dissent while re jecting the latter as an abridgement of the freedoms of the individuals who may be its object.

The following was approved by the University's Board of Trustees on Octobe 19, 1968:

The George Washington University is opposed to discrimination based on race, color, or creed. Such discrimination may have appeared in campus organizations in the past. In the future, however, no organization can be recog nized or supported by the University unless it provides continued assurance of nondiscrimination in membership practices and in intent, considered adequate by relevant committees and officers of the University.

The following was approved by the University's Board of Trustees on Octobe 19, 1968:

The University cannot condone violations of law, including violation of those laws which proscribe possession, use, sale, or distribution of certain drugs. Members of the academic community should know that administrative action, which may include dismissal from the residence halls, revocation of other privileges, or suspension or dismissal from the University, may be taken in order to protect the interests of the University and the rights of others.

The Board of Trustees reaffirms the responsibility of the President and the Faculty to continue to implement this policy.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on January 16, 1969:

Be it resolved by the Senate of The George Washington University: Any member of the University (including as members of the University all persons having a formal connection with the University)

(a) who engages in conduct that unreasonably obstructs teaching, research, and learning, or

(b) who unreasonably obstructs free access to members or guests of the University or to University buildings, or

(c) who disobeys general regulations of the University, or

(d) who damages University property or injures members or guests of the University,

may be punished for his conduct by dismissal from the University, or by some lesser disciplinary action, through procedures established within the University for the government of its members.

In order to insure due process, any student subject to dismissal or other disciplinary action on the grounds of violating any of the premises of this resolution shall have, at his discretion, the right of review of the action by the University Hearing Committee on Student Affairs.

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1/71—Cornelius—19M

COLLEGES AND SCHOOLS—DEGREE PROGRAMS

OLUMBIAN COLLEGE OF ARTS AND SCIENCES: Associate in Arts (A.A.), Bache-r of Arts (B.A.), Bachelor of General Studies (B.Gen.Std.), Bachelor of Sci-ice (B.S.), Bachelor of Science in Environmental Health (B.S. in Env.Health), achelor of Science in Geodetic and Cartographic Science (B.S. in Geod. and art.Sc.), Bachelor of Science in Medical Technology (B.S. in Med.Tech.), and achelor of Science in Oceanography (B.S. in Ocea.)

ADUATE SCHOOL OF ARTS AND SCIENCES: Master of Arts (M.A.), Master of ne Arts (M.F.A.), Master of Music (Mus.M), Master of Science (M.S.), aster of Science in Forensic Science (M.S. in Forens.S.), Master of Science r Teachers (M.S. for Teachers), and Doctor of Philosophy (Ph.D.)

HOOL OF MEDICINE: Doctor of Medicine (M.D.)

TIONAL LAW CENTER: Juris Doctor (J.D.), Master of Laws (LL.M.), Master Comparative Law (M.Comp.L.), Master of Comparative Law (American actice) (M.Comp.L.(Am.Prac.)), and Doctor of Juridical Science (S.J.D.)

HOOL OF ENGINEERING AND APPLIED SCIENCE: Bachelor of Science (Civil En-ering) (B.S. (C.E.)), Bachelor of Science (Electrical Engineering) (B.S. E.)), Bachelor of Science (Measurement Science) (B.S. (Meas.S.)), Bache-of Science (Mechanical Engineering) (B.S. (M.E.)), Master of Science I.S.), Master of Engineering Administration (M.E.A.), and Doctor of Sci-e (D.Sc.)

HOOL OF EDUCATION: Bachelor of Arts in Education (B.A. in Ed.), Bachelor Science in Physical Education (B.S. in P.E.), Master of Arts in Teaching .A.T.), Master of Arts in Education (M.A. in Ed), Education Specialist d.S.), and Doctor of Education (Ed.D.)

OOL OF GOVERNMENT AND BUSINESS ADMINISTRATION: Bachelor of Business inistration (B.B.A.), Bachelor of Science in General Studies (B.S. in .Std.), Master of Arts in Government (M.A. in Govt.), Master of Arts ealth Care Administration (M.A. in H.C.A.), Master of Business Adminis-on (M.B.A.), Master of Public Administration (M.P.A.), Master of Science dministration (M.S. in Adm.), Master of Urban and Regional Planning of Urb. and Reg.Plan.), Graduate Certificate in Health Care Administra-(Grad.Cert. in H.C.A.), Doctor of Business Administration (D.B.A.), Doctor of Public Administration (D.P.A.)

OL OF PUBLIC AND INTERNATIONAL AFFAIRS: Bachelor of Arts (B.A.), Cer-te of the Institute for Sino-Soviet Studies (Cert. of I.S.S.S.), Master of (M.A.), and Master of Science in International Affairs (M.S. in I.A.)

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SCHEDULE OF CLASSES: FALL AND SPRING SEMESTERS, Registrar

SCHEDULE OF CLASSES: SUMMER SESSIONS, Dean of the Summer Sessions

nts registered at George Washington University during the spring semester should not apply for admission to the Summer Sessions, but should report on 14 to the first floor of the University Library, where detailed information and necessary registration materials will be provided.

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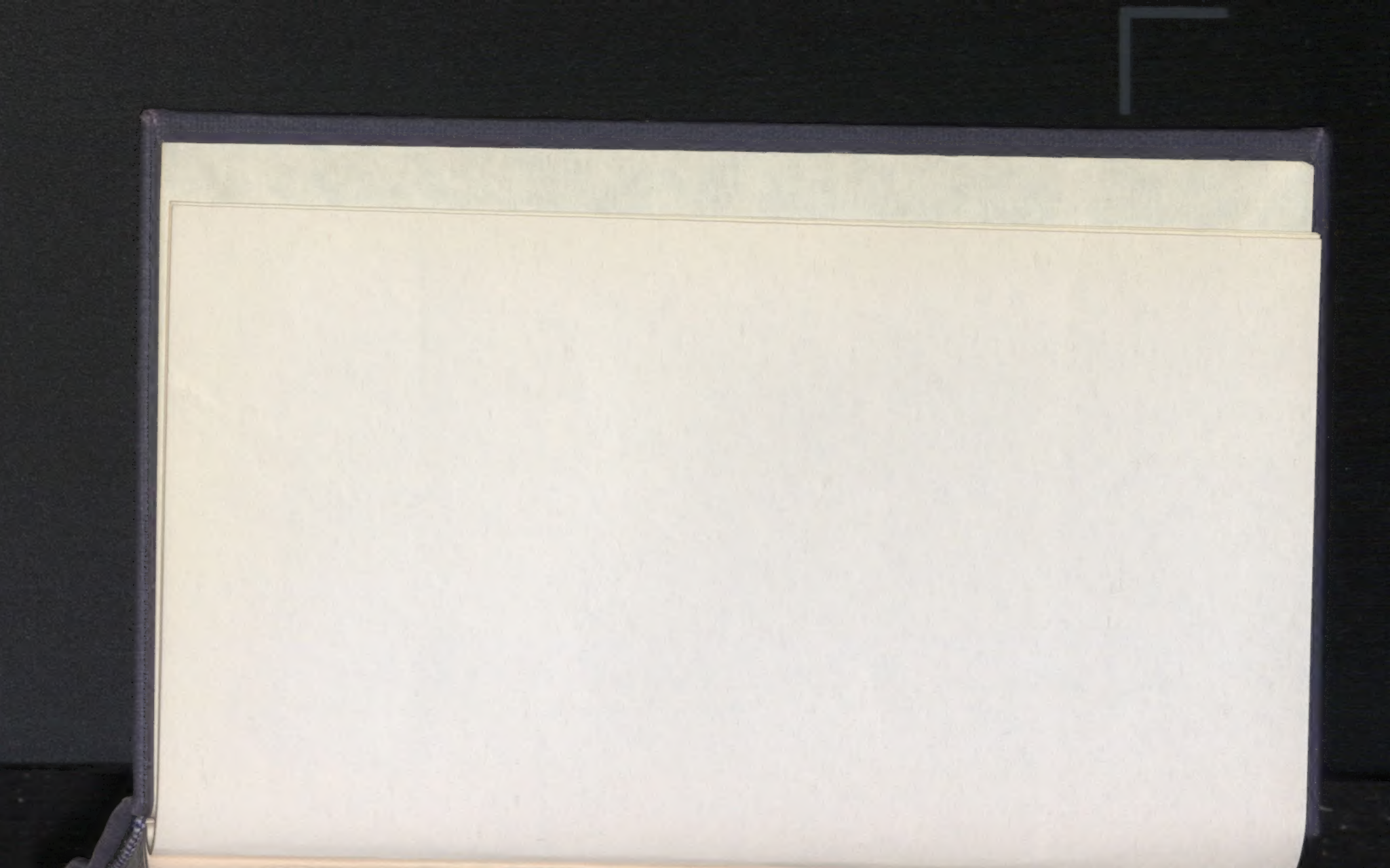
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THE GRADUATE SCHOOL OF ARTS AND SCIENCES, 1893

THE SCHOOL OF MEDICINE, 1825

THE NATIONAL LAW CENTER, 1865

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE, 1884

THE SCHOOL OF EDUCATION, 1907

THE SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION, 1928

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